GENERAL INDEX.

(*Illustrated Subjects are Marked with an Asterisk after the Number of the Page.*)

A.

A.1. Electric Welding Machines and Rivet Heater, 764*, 827*
Aberdeen-Laxapana Water-Power Scheme, Ceylon, 473*
Abrams, Prof. D. A., on Waters for Mixing Concrete, 618
Accelerometer, Recording, the Cambridge, 287
Accident Compensation. See *Workmen's Compensation* under *Labour*

Accidents :

Boiler Explosions and the New Factory Bill, 334.
Civil Aviation, Causes of Accidents, 231
Collieries, Electric Shock Fatalities, 243
Factory Accidents, Statistical Investigation, Industrial Fatigue Research Board, 709. See 701, 746, 810
— — Home Office Report, 773
Machinery Failures, Report on, 417. See LETTERS, 486, 548
Power Presses, Safety Precautions, 18
Railway Accident, Report on, 484
Shipbuilding Work, Prevention of Accidents, Report, 333
Shipping Losses, Lloyd's Statistics, 166, 267. 519, 820

Accumulators, Electric. See *Electric*
— Steam, Use in Factories and Plants, 68*
— Vehicles. See *Motor Vehicles*
Acetylene-Oxygen Blowpipe. See *Blowpipe*
— Welding. See *Welding*
Acid Pickling, Steel, Tinplate Manufacture, 365
— Sulphuric, Manufacture, Report, 127
Acidity of Raw Rubber, 334
Acoustics, Architectural, Research in, 411
— Electrical Production of Vowel Sounds, 828
— Nature of Speech, 411
Acre, Investigations of Horizontal Tacheometry, 505*
Activated Sludge. See *Sewage*
Adamson, J., & Co., Overhead Crane with Underslung Bridge, 164*
Addison, H., on Water Supply, Egyptian Towns, 735
Address, Presidential. See *Presidential Address*
Aden, Electric Power Supply for, 348, 487
Administrative Work, Engineers' Part in, 375
Admiralty Gun Metal, Effect of Casting Temperature and Mass, 436*. See 409
— See also *Warships*
Aerial Navigation. See *Aeronautics*
— Propellers. See *Propellers* under *Aeronautics*
— Ropeway. See *Wire Ropeway*
— Transport. See *Aeronautics*
Aerodynamics. See *Aeronautics*
Aeronautical Society, Royal, Prof. L. Bairstow on Skin Friction, 742. See LETTER, 831*

Aeronautics :

Aerodynamics, Bjerknes' Experiments, Pulsating Capsules, 409
— Influence on Naval Architecture, 722. See 713
— Theory of Skin Friction, 742. See LETTER, 831*
Aeronautical Research Committee, Work of Fatigue Panel, 245. See 284
Aeroplanes and Coast Defence, 170
— Design, Weight of Power Plants, 85
— Imperial Communications, 450
— Lift, Theory of, Bjerknes' Experiments, 409
— Light, Proposed Flying Clubs, 232. See 525
— — Two-Seater, Lympne Trials, 525*. See 232, 549, 652
— — Two-Seater, the Wee Bee I, 525*
— Military, Bristol Bloodhound, 114
— Naval, Protection from Gunfire, 418
— Single Seater Fighter Siskin II, 870*
— United States Naval, Developments, 490
— See also *Seaplane* (below)
Air Ministry, Remuneration of Engineers, 862
— — Trials, Light Two-Seater Aeroplanes, 525*. See 232, 549, 652
Airship Construction, Armstrong, Whitworth & Co., Ltd., 187 ; W. Beardmore & Co., Ltd., 188
— Floating Base U.S.S. "Patoka," 490
— Imperial Communications, 450
— Passenger, for British Government (Vickers Ltd.), 651
— United States Naval Development, 490
— Z.R.3 U.S. Navy, Transatlantic Voyage, 548

Aeronautics—*continued.*

Ambulance Seaplane, Fairey, British Guiana, 593
Blasius Theory of Skin Friction, 742. See LETTER 831*
Circulation Theory, Aviation and the Flettner Rotor Ship, 710, 770. See LETTER 831*
Civil Aviation, Causes of Accidents, 231
— — and Imperial Communications, 450
— — Report on, 231
— — See also *Airships* (above)
Engine, Petrol, Aeroplane, Bristol Jupiter, Swedish Government Tests, 112 ; Service Performance, 542
— — Aeroplane, 385-h.p. Jaguar Air-Cooled Radial, 870*
— — Aeroplane, Weight Considerations, 85
Flettner Rotor Ship, Theory of, 710, 770. See LETTERS 831*
Flying Clubs, Light Aeroplanes, Proposed 232. See 525
Guns, Anti-Aircraft, New American Weapons, 204
Lanchester-Prandtl Theory, Aviation, and the Flettner Rotor Ship, 710, 770. See LETTER 831*
Lympne Trials, Light Two-Seater Aeroplanes, 525*. See 232, 549, 652
Military Aeroplane, Bristol Bloodhound, 114
Naval Architecture, Aeronautics in, 722. See 713
"Patoka," U.S.S. Airship Base, 490
Prandtl Theory, and the Flettner Rotor Ship, 710, 770. See LETTER 831*
Propellers, Aerial and Marine, Design, 723
Seaplane, Fairey Ambulance, British Guiana, 593
— United States Naval, Developments, 490
"Shenandoah," U.S. Airship, Operations with, 489
Ship, Flettner Rotor, Theory of, 710, 770. See LETTER 831*
Skin Friction in Aeronautics, Theory of, 742. See LETTER 831*
See also PARAGRAPH INDEX

Aeroplanes. See *Aeronautics*
Africa, French Colonies, Railway Requirements 674
— Northern, Port of Tripoli, 838
Agreements, Labour. See *Labour*
Agricultural Engineering, Oxford Institute of, Artificial Drying of Crops, 554*
— Hall. See *Exhibition*
— Industry, South Africa, 173
— Machinery, Anti-Balance Cable Plough, 516* See 382, 807
— — British Empire Exhibition, 382. 516*
— — Cable Ploughing Tackle, Fowler's, 382, 516*, 807
— — New Zealand, British Empire Exhibition, 289*
— — Sunshine Harvesting Machine, 383
— Motors. See *Engines ; Motors ; Tractors*
— Show, Smithfield, 807
— Society, Royal, Leicester Show, 20*, 59*
— Tractors. See *Tractors*
Agriculture, Adaption to Climate, 181
— Drying Crops by Hot Air, 554*
— Indian, Co-operation in, 509. See 537
— Use of Electricity in, 84, 116, 382
— — of Machinery in, 382
— See also *Irrigation* and PARAGRAPH INDEX
Air Circulation, Influence of Water Vapour, 410
— Compressed. See *Compressed Air ; Pneumatic*
— Compressing Plant, British Empire Exhibition Colliery, 190*
— Compressors (Canadian Ingersoll Rand Co.), 138*
— — Five-Stage, Charging Compressed Air Locomotives (Belliss & Morcom, Ltd.), 498*
— — Flow Indicator for Cooling Systems, 548
— — High-Pressure Marine Type (G. & J. Weir, Ltd.), 425*
— — Horizontal Two-Stage (Walker Bros. (Wigan, Ltd.), 190*
— — and Petrol Engine, Portable, the Broomaster, 179*
— — Portable, Colliery Use (Mavor & Coulson, Ltd.), 191* ; Broom & Wade, Ltd., 766*
— — Portable Steam-Driven (Merryweather & Sons, Ltd.), 753*
— — Vertical, Electrically Driven (Broom & Wade, Ltd.), 191*
— — Vertical Two-Stage, Steam-Driven (Browett, Lindley & Co., Ltd.), 690*
— Ejectors, Condensing Plant, S.S. "Drottningholm," 841*
Air Flow Measurements, Balanced Manometer, 223*
— — Meters (G. Kent, Ltd.), 193*
— Humidifying Apparatus, Textile Mills, Andrew System, 873*
— Humidity Measurements, National Physical Laboratory, 278*
— Ministry, Remuneration of Engineers, 862
— — Trials, Light Two-Seater Aeroplanes, 525*. See 232, 549, 652
— Pollution, Automatic Measurement, 410
— Preheater, Boiler Furnaces, Rectangular Tube, 209*
— Pump. See *Pump*
— Screws. See *Propellers* under *Aeronautics*
— Vent, Calcium Chloride, Transformers, 802*
— Washers and Filters, for Ventilation, 780
— See also *Atmosphere*
Aircraft. See *Aeronautics*
Airolite Wind-Driven Electric Lighting Plants, 60
Airships. See *Aeronautics*
Aitchison, Dr. L., on Volume Changes in Steel during Heat Treatment, 351* ; on the Use of Light Alloys. 455
Ajax-Northrupp Electric Furnace, 6
Aktiebolaget Finshyttan, Tests of Lawaczeck Turbines, 851*
Aktiebolaget de Lavals Angturbin, Geared Turbines S.S. "Drottningholm," 841*
Alcohol, Dehydration by Glycerin, 344
— Power, Production and Uses, 77, 616
Alkali-Chlorine Products, Canadian Manufacture, 448
— Works, Report on, 1923, 127
Allen, E., & Co., Ltd., Coal-Measuring Apparatus, Boiler Furnaces, 242* ; Drying Stoves, Gas and Coke Firing, 460
Allen, W. H., Sons & Co., Ltd., 400-kw. Geared Turbo-Generator, 372*
Allowances in Machine Work. See *Gauges ; Gauging*
Alloys. See *Metallurgy ; Microphotographs ;* and PARAGRAPH INDEX
Alternating Current. See *Electric*
— Stress. See *Tests (Materials)*
Alternators. See *Generators, Electric ; Turbo-Alternators*
Alumina-Silica Materials in Firebricks, 481
Aluminium Alloys. See *Alloys* under *Metallurgy*
— Corrosion by Sea Water, Protection, 335
— Determination of Sodium in, 409
— Purification of, 6
— Tensile Strength, Temperature and Cold Work, Relationship, 408
— Use in Electrical Engineering, 57
— — in United States, 838
— See also *Metallurgy ; Metal-Price Diagrams*
Ambulance Seaplane, British Guiana, 593
American Bureau of Shipping. See *United States*
— Iron and Steel Institute. See *Iron and Steel*
— Locomotive Company, Mallet Simple Locomotive, Chesapeake and Ohio Railroad, 795*, 860*
— Navy. See *United States* under *Warships*
— Society of Mechanical Engineers. See *Mechanical Engineers*
— — of Naval Architects and Marine Engineers. See *Naval Architects*
— See also *United States*
Ammonia Compressor, Electrically-Driven (Haslam Foundry and Engineering Co., Ltd.), 290*
— — High-Speed, Refrigerating Plant, 561*, 594*
— Refrigerating Plants. See also *Refrigerating*
— Synthetic Manufacture, Haber Process Franco-German Agreement, 263. See 372
— — Manufacture, Recent Developments, 263. See 372
— — Manufacture, Report, 116
Analysis, Chemical, Determination of Sodium in Aluminium, 409
— — Oxygen Determination in Pure Iron, 366
— Crystal Structure, X-rays, 349*, 368, 428
— Exhaust Gases, Marine Diesel Engines, 730, 752. See 799
— Fuel Oil, Marine Diesel Engine Trials, 751, 784
— Steel, Standard Specimens, 439
Anchors and Chains, British Empire Exhibition, 100
Anchorages, Pipe Line, Stress Distribution, 763*
Anderson, D., & Son, Ltd., Fireproof Bitumen Roofing Material, 166
Anderson, E., on Sulphur in Rubber, 566
Anderson, Sir K., on the Shipping Industry, 265
Anderson, R. J., on Internal Stresses in Brass Tubes, 378
Andrew Machine Construction Co., Ltd., Air Humidifying Apparatus, 873*
Angelo, A. R., on Electric Power Transmission, Norway to Denmark, 114. See 78
Annealing. See *Heat Treatment* under *Metallurgy*
Annual Publications. See LITERATURE INDEX
Anti-Aircraft Guns. See *Guns*
— Friction Metals. See *Alloys* under *Metallurgy*
Antimony Alloys. See *Alloys* under *Metallurgy*
— Prices. See *Metal-Price Diagrams*
Apples, Rail and Sea Transport, 743*
Appointments. See PARAGRAPH INDEX
Apprentices, Dockyard, and Whitworth Scholarships, 741. See LETTERS, 746, 770, 810, 831, 861
— Engineering, Training of, 122
— See also *Education*
Arbitration in Labour Disputes. See *Labour* and PARAGRAPH INDEX
Arc. See *Electric ; Furnace ; Welding*
Arch, Boiler Furnaces, Pluto Suspended, 113*
— Bridge, Cast Iron, French Railway, Repairs, 557
— — Ferro-Concrete, Salmon River, N.Y., Timber Centring for, 257*
— Dam, Multiple, River Tirso, Sardinia, 632*
— — Recent Swedish Designs, 76
— Viaducts, Penang Hills Railway, 667*
Archdale, J., & Co., Ltd., Milling Machines, 353* ; Drilling Machines, 359*
Architects, Naval. See *Naval Architects*
Architectural Acoustics, Research in, 411
Arctic Regions, Danish Surveying Expedition, 344
Arcwall Coal-Cutting Machine, 225*
Argentine, Oilfields of, 651
— Buenos Ayres Great Southern Railway, Locomotive, 280*
Argon, Solid, Crystal Structure, 368
Ariey Coal Seam, Fuel Research Board Investigations, 552
Armament. See *Guns ; Warships*
Armfield, J. J., & Co., Ltd., Hydraulic Turbines and Governor, 610*
Armour Plates, Beardmore, 187* ; Hadfields, Ltd., 189
— Protection, Naval Aeroplanes, 418
— See also *Warships* and *Naval* in PARAGRAPH INDEX
Armoured Ships. See *Warships*
Armstrong-Siddeley Motors, Ltd., Jaguar Aero Engine, 870*
Armstrong, Whitworth Aircraft, Ltd., Siskin II Aeroplane, 870*
Armstrong, Whitworth & Co., Ltd., Hydro-Electric Power Plant, Newfoundland, 125* ; Naval Exhibits, British Empire Exhibition, 185*. See *Errata*, 423 ; Locomotive for Buenos Ayres Great Southern Railway, 280* ; Vertical Turning and Boring Mill, 699* ; Bascule Bridge, Bann River, Ireland, 758*
Army Authorities and Organisation for Munitions Supply, 201
Arrol, Sir W., & Co., Ltd., 25-Ton Electric Level-Luffing Crane, 104*. See 238 ; Designs for Sydney Harbour Bridge, 129*. See 169, 198*
Arsenious Oxide, Effect on Colourless Glass, 786
Arterial Roads. See *Roads*
Articulated Locomotive, Mallet Simple, Chesapeake and Ohio Railroad, 795*, 860*
Artillery. See *Guns* and PARAGRAPH INDEX
Arts, Royal Society of, Short-Wave Radio Communication, by Senator G. Marconi, 17, 836 ; London County Council Evening Classes, 377 ; Mechanical Transport on Roads, by Col. R. E. Crompton, 681 ; Science Teaching in Technical Schools, by Prof. C. A. Carus-Wilson, 865
Arundel, Coulthard & Co., Ltd., Winding Frame, Cotton Yarn, 91*
Ashdown Rotoscope, Investigation of Moving Machinery, 236
Ashton, D., & Co., Ltd., Haulage Gear, 766*
Ashworth, E., Carding Engine, 89*
Asquith, W. (1920), Ltd., Drilling Machines, 358*
Association, British. See *British Association*
— Engineering. See *Institutions*
Astronomical Papers, British Association, 410
Astronomy, Mass of Celestial Bodies, Loss by Radiation, 802
— Mount Wilson Observatory, Measurements of Light Velocity, 738
— Solar Spectrograph, Poulkovo Observatory, 87*
— Spectra of Nebulae, 410
— Wireless Time Signals, International Investigations, 410
Atherton Brothers, Ltd., Jacquard Loom, 250*
Atkins, E. A., on Manufacture of Steel Wire, 630

Atlantic Liners. See *Steamers*
Atmosphere, Circulation of, Influence of Water Vapour, 410
— Upper, Observations on, 410
Atmospheric Discontinuities and Weather Forecasting, 410
— Nitrogen, Fixation, Haber Process, Franco-German Agreement, 263. See 372
— — Fixation, Report, 116
— Pollution, Automatic Measurement, 410
— — Report on Alkali Works, 128
Atom, Helium, Metastability of, 322
—, Mercury, Orbital Transfers of Electrons, 367
Atomic Disintegration, Ejection of Protons, 368
— Structure, Metals, and Effects of Stress, 715
— — Metals, Removal of Electrons by Electric Field 322
Atomising Nozzles, Air-Humidifying Apparatus 874*
"Aurania," Cunard Liner, 380
Austin, G., Ltd., Constant-Current System, Ships' Auxiliary Machinery, 734*
Austin Motor-Car, Front-Wheel Brakes, 607*
Australasia, Power Resources, 19, 31
Australia, Morwell Power Scheme, Excavating Machine for Brown Coal, 299*
— Sydney Harbour Bridge, Competitive Designs, 129*, 169. See LETTER, 198*
Australian Agricultural Machinery, 383
Austria, Electric Power Transmission and Distribution, 78
— Electro-Chemical Industry, 116
— Fuel Economy in, 41
— Industrial Research in, 115
— Power Resources, 32. See 19, 41
— Railway Electrification, 117
— Water-Power Production, 44
Auto-Transformer Starter, Induction Motors, 107*
Autogenous Welding. See *Welding*
Automatic Coupling, Willison, Central-Buffer Type, 478
— Machine Tools. See *Machine Tools*
— Self-Closing Valves for Pipe Lines, 143*
— Signalling. See *Signalling*
— Sluice Gates, Spillway, Tirso Dam, 635*
— Stokers. See *Stokers*
— Substation. See *Substation*
— Telephones, Relay System, Chatham Dockyard and Hospital, 373
— — Strowger System, York, 862
— — Systems (Review), 663
— Temperature Control Electric Furnaces, 451*; Gas Furnaces and Steam Heating, 628*
Automobile Engineers, Institution of, The Use of Light Alloys, by Dr. L. Aitchison, 455; Presidential Address by Dr. W. E. Ormandy on Research, 551; Electric Road Vehicles, by D. E. Batty, 688*, 719; Maintenance of Commercial Vehicle Fleets, by Major E. G. Beaumont, 712; The Tyre as a Part of the Suspension System, by A. Healey, 805
— See *Motor-Cars*
Auxiliary Machinery, Marine. See *Marine*
Avery, W. and T., Ltd., Weighing Machine, Colliery Tubs, 338
Aviation. See *Aeronautics*
Axles, Motor-Car, Drilling Machine for, 359*
— — Car. See also *Motor-Car Details*
— Railway and Tramway, British Empire Exhibition, 99, 438, 439
Aylesbury, Gas Manufacture, Travers-Clark System, 23
Azores-New York Telegraph Cable, 461

B.

BACHO Adjustable Wrench, 113*
Badische Anilin und Soda Fabrik, Synthetic Nitrogen Products, French Agreement, 263. See 372
Bailey, Dr. T. L., Report on Alkali Works, 127
Bain, E. C., on High-Speed Steel, 347, 393
Baird & Tatlock (London), Ltd., Exhibit at British Empire Exhibition, 439
Bairstow, Prof. L., on Skin Friction, 742. See LETTER, 831*
Balanced Manometer, Gas-Flow Measurements, 223*
Balancing System, Internal-Combustion Engines, Blackstone's, 593*. See 22
Bale-Breaking Machine for Cotton, 12*
Ball Bearings. See *Bearings*
— Hardness Tests. See *Hardness* under *Tests (Materials)*
— Steel, Compression of, Formula, 101
— — Hardness Tests, Improvements, 367
Ballard, W. E., on Metal Spraying, 409
Balloon Tyres for Motor-Cars, Advantages, 805
Bamber, H. K. G., the Late, 462
Band Conveyors. See *Conveyors*
— Spectra and Molecular Structure, 322
Bann River, Strauss Bascule Bridge, 758*
Bar-Screwing Machine. See *Machine Tools*
Barbados, Steam Tug and Water-Boat "Lord Combermere," 370*. See *Erratum*, 415
Barford & Perkins, Ltd., Motor Roller, 59*
Barker, T. V., on Formation of Crystals, 738
Barley, F. W., Comparison of Gas and Coke-Fired Drying Stoves, 460
Barnard, H. C., the Late, 686
Barrage, Severn Tidal-Power Scheme, 294
Barrel Washing Machine, Brewers' Exhibition, 649
Barrow Hematite Steel Co., Gas-Blowing Engines, Working Results, 830*
Barugh Low-Temperature Carbonisation Plant, Trials, 588*
Bascule Bridge. See *Bridge*
Bassler Liquid Meter, 497*
Bassom, A. E., on London Traffic, 651
Bastian, C. O., the Late, 654
Bateman High-Speed Planing Machine, 362*
Batteries. See *Electric*
Battery Vehicles. See *Motor Vehicles*
Battleships. See *Warships*
Batty, D. E., on Electric Road Vehicles, 688*, 719
Baumann Multiple Exhaust, 7,000-kw. Turbine Tests, 253*
Bauxite Industry, United States, 838
Beams, Effect of Taper on Shear Stresses, 789*
— Ferro-Concrete, Quick-Hardening Cement, Tests, 867
— Hack Sawing Machines for, 320*, 445*
— System, Radio Communication, 17, 836
Beardmore, Wm., & Co., Ltd., Naval Exhibits, British Empire Exhibition, 187*; Light Two-Seater Aeroplane, 525*
Beardmore-Tosi Marine Diesel Engine, 83; Trials of M.S. "Silurian," 643; Trials of M.S. "Sycamore," 730, 750*, 784*, 798
Bearings, Cold-Rolling Mills, Design and Lubrication, 569*, 601*, 636*. See LETTER 769*
— Metals. See *Alloys* under *Metallurgy*
— Michell Radial, Cold-Rolling Mills, 769*
— — Thrust, S.S. "Drottningholm," 841*
— Oil-Groove Cutting Machine, 444*
— Pressures, Marine Diesel Engines, 28*
— Roller, Railway Signalling Work, 9
Beatty Brothers, Washing Machines, 140*
Beaumont, Major E. G., on Maintenance of Commercial Vehicle Fleets, 712
Beck, O. N., Centrifugal Oil Purifier, 274*
Beck, R. & J., Ltd., Vertical Illuminator for Microscopes, 30*
Beilby, Sir G., the Late, 202*
Belgian Coal, Iron and Steel Industries, 838
Belgium, Power Resources, 32. See 19
Bell, Sir T., on Shipbuilding and Shipping Economics, 265
Bellias & Morcom, Ltd., Air Compressor, 498*
Belt Conveyors. See *Conveyors*
— Pulleys, Lathe for Turning, 358*
"Benbow," H.M.S., Model, British Empire Exhibition, 187
Bending Machine. See *Machine Tools*
— Tests. See *Tests (Materials)*
Bengal-Nagpur Railway, 42-Ton Hopper Coal Wagon, 279*
Bengough, Dr., Report on Corrosion, 378
Bennis, E., & Co., Ltd., Automatic Coal Conveyor and Mechanical Stokers, 766
Bentall, E. H., & Co., Ltd., Coffee-Preparing Machinery, 541*
Bentley, H., & Co., Ltd., Road Transport of Turbo-Alternator Stator, 552
Bentley Motor Car, 579*. See *Erratum*, 610
Bergen, Electric Power Supply, 85
Berry, H., & Co., Hydraulic Press, Brass Rod Extrusion, 387*. See 379, 415
Bertin, L. E., the Late, 744
Bevel Gears. See *Gears*
Bicycles. See *Cycles* and *Motor Cycles*
Bilge Pump, Emergency, Gwynnes Invincible, 2*; Drysdale & Co., Ltd., 217*
Binary Alloys. See *Alloys* under *Metallurgy*
Bio-Aeration, Sewage Purification, 241. See 286
Biplanes. See *Aeronautics*
Birmingham, British Industries Fair, 524
— Drainage Board, Sludge Pump for, 211*
— Electric Supply, Mercury-Vapour Rectifier Sub-Stations, 783*, 845*
— Gas Department, Research Laboratory, Industrial Kinematography, 295*
Birmingham Small Arms Tools Ltd., Centreless Grinding Machine, 404*
Bismuth Alloys. See *Alloys* under *Metallurgy*
Bitumen Roofing Material, Fireproof, Tests, 166
Bjerknes' Experiments, Pulsating Capsules, 409
Blackstone & Co., Ltd., Cold-Starting Oil Engines, 60*, 638*. See 21; Synchro Balance Engine, 593*. See 22
Blading, Brush-Ljungstrom Steam Turbine, Manufacture, 699
— Impulse, Steam Turbine, Proportioning, 473*
— Nickel Steel, English Electric Co.'s Turbo Generator, 762*
— Steam Turbine, Deposits on, 417
Blasius Theory of Skin Friction, 742. See LETTER, 831*
Blast Furnaces. See *Furnaces*
Block, Foundation, Eccentrically-Loaded, Stress Distribution, 763*
— Gauges, Measuring Machine for, 129*
— Instrument, One Wire Three Indication, Railway Signalling, 10*
Blomquist, V., on Steam Generation at High Pressures, 432. See 41
Blowing Engines, Blast-Furnace, Barrow Hematite Steel Co., Working Results, 830*
Blowpipe, Oxygen, Godfrey Cutting Machine, 124*
— See also *Welding; Cutting*
Board of Trade Regulations, Safety of Life at Sea, 587
— — See also *Overseas Trade Department*
Boat, Flying. See *Seaplane* under *Aeronautics*.
— Folding, the Collet, 843*
— Life-Saving, Merchant Ships, New Regulations, 587
— Motor. See *Motor Boat*
— Seasled Type, Motor-Propelled, 460*
— Submarine. See *Warships*
— Winch, Williams-Janney Gear, 211*
Boby, R., Ltd., Refrigeration Plant, Brewers' Exhibition, 649
Bodies, Motor Car, Design and Construction (Review), 663
Bogie, Four-Wheeled, Double Bolster, 280*
— — Wheeled, Railway Motor Coach, 7*
— — Wheeled, Royal Coach, Egyptian State Railways, 475*
— — Wheeled, Vestibule Carriage, London, Midland & Scottish Railway, 162*
Bohr, Prof. N., Presentation of Orsted Medal to, 733
Boilers, Capacity Rating, 56. See LETTERS, 101
— Electrically-Heated, Steam Generation, 127, 449
— Explosions and the New Factory Bill, 334
— Feed Pump. See *Pump*
— — Water Meter, Vee Notch, Lea Closed-in Type, 598*
— Firing, Coke for Fuel, 40, 82
— — Pulverised Coal for, 39, 40, 198, 480. See *Erratum*, 91
— Fowler's Steam Wagon, 855*
— Furnaces. See *Furnace* and *Stoker*
— Heat Losses in Combustion 40*
Boilers, Inspection, Report on, 417
— Lancashire Type, Lea Coal-Measuring Apparatus, 598*
— Locomotive, Chesapeake and Ohio Railroad, 797*. See 860*
— — See also *Locomotive*
— Marine, Furnace Arrangements, Coal or Oil-Firing, 346*
— — Oil Fuels for Firing, 836
— — Treatise on (Review), 336
— Oil-Fired, Wallsend-Howden Oil-Fuel System, 345*
— Plant, Cardiff Engineering Exhibition, 766
— — Temperature Measurement and Fuel Economy, 40
— — United States, Recent Practice, 29, 42
— — Use of Steam Accumulators, 68*
— Room, S.S. "Orama," 604*. See 543*, 643
— Sentinel Type, Railway Motor Coach, 6*. See *Errata*, 133
— Steam Generation, Extra High Pressures, 41, 181*, 432, 588
— Trials, Standardisation of Methods, 55, See LETTERS, 101. See also 818*, 835, 866*
— Vertical, Cochran Type, Oil-fired, 501*
— Waste Heat, with Vertical Gas Retorts, 23
— Water-Tube, Vertical, Merryweather Portable Air-Compressing Set, 753*
— — Yarrow Type, Londonderry Power Station, 177*; Brighton Corporation Power Station, 372*. See 415; Warship Propulsion, 458*
— See also *Engines and Boilers* in PARAGRAPH INDEX
Bolt, Connecting Rod, Composite Material, Fracture of, 418
— Screwing Machine See *Screwing Machine* under *Machine Tools*
Bombay Water-Supply, Lake Tansa Pipe Line, 562*
Books, New, Notes on, 238, 342, 390, 433, 509, 559, 594, 612, 657, 672, 700, 779, 825. See LITERATURE INDEX
— Received, 132, 238, 337, 372, 496, 525, 557, 590, 620, 657, 673, 701
Booth, J., and Brothers, Ltd., Electric Colliery Locomotive, 252*
Bore Hole, Sir C. A. Parsons' Suggested, 548
Boring Machine. See *Machine Tools*
Bottle-Washing Machines, Brewers' Exhibition, 649
Boulongne, M. de, on Repairs to La Voulte Viaduct, 557
Bouly, H. G., on Fluid Transmission Gears, 842
Boussenot, G., Report on Defence of French Coasts, 170
Boveri, Dr. W., the Late, 622
Bows, Ships', Construction for Collision, 618
Box, Nailing and Printing Machines, 544*
Bradfield, J. J. C., Report on Sydney Harbour Bridge Designs, 129*, 169. See LETTER, 198*
Bragg, Sir W. H., on Analysis of Crystal Structure by X-Rays, 349*, 428. See 368
Braithwaite & Co., Pipe Line, Bombay Water-Supply, 562*
Brake, Motor-Car. See *Motor-Car Details*
— Gear, Penang Hills Funicular Railway: Passenger Cars, 728*; Electric Winding Engine, 791*, 852*
Brancker, Air Vice-Marshal Sir S., on Imperial Communications, 450
Brass, Corrosion of. See *Corrosion*
— Foundry. See *Foundry*
— Ingots and Castings, Standard Specifications, 261
— Products, British Empire Exhibition, 335
— Rod, Extrusion, Inverted Process, 387*. See 379, 415
— Tensile Strength, Temperature and Cold Work, Relationship, 408
— Tubes, Measurement of Internal Stresses, 378
Brasses, Cold-Rolling-Mill Bearings, Design, 569*, 601*, 636*. See LETTER, 769*
Brassey's Naval and Shipping Annual (Review), 809
Breakdowns. See *Accidents*
Breathers, Calcium Chloride, Transformers, 802*
Brett's Patent Lifter Company, Ltd., Drop Stamps for Multiple-Impression Dies, 705*
Brewers' Exhibition, Agricultural Hall, 649
Bricks, Fire. See *Firebricks; Refractory Materials*
Brickwork Culvert, Damage by Molluscs, 775
Bridge, Admiral Sir C., the Late, 268
— Bascule, Strauss Type, River Bann, Ireland 758*
— Cast-Iron Arch, French Railway, Repair Work, 557
— Construction, Danish Projects, 292
— — Schemes in Parliament, 777
— Erection Work, Derrick Car for, 758*
— Ferro-Concrete Arch, Salmon River, N.Y., Timber Centring for, 257*
— Indian Native, 536*
— Ladder, Mount Everest Expedition, McGruer Spar Construction, 304*
— London, and Cross River Traffic, 641, 647
— Sydney Harbour, Competitive Designs, 129*, 169. See LETTER, 198*
— Traffic, Intersections of London Streets, 641, 648
— Waterloo, Proposed Reconstruction, 102, 807. See 641, 647, 676
— — and Southwark, Foundation Settlements, 641. See 102, 647, 676, 807
— Westminster, Stress Measurements, 296
— Wind Pressure on, Measurement, 800
— See also *Viaducts* and PARAGRAPH INDEX
Brighton Corporation, Southwick Power Station, Extensions, 372*. See 415
Brinell Tests. See *Hardness* under *Tests (Materials)*
Bristol Aeroplane Co., Ltd., Bristol Juniter Aero Engine, Swedish Government Tests, 112; Service Performance, 542; Bristol Bloodhound Military Aeroplane, 114
— Electricity Works, Tests of Turbo-Generator, 253*
— Port of, Oil Engines for Grain Elevator, 643*
Britannia Lathe and Oil Engine Co., Ltd., Small Lathe, 447

British Association (Toronto Meeting):
Preliminary Remarks, 98
Inaugural Meeting, 265
Presidential Address, by Sir D. Bruce, on the Prevention of Disease, 265
Impressions of the Meeting, 506. See 539
Western Excursion, General Account, 506, 539
Popular Lecture on Relativity, by Prof. A. S. Eddington, 535
Concluding Remarks, 480

Section G.—Engineering:
Programme, 94
Reports of Discussions, 266, 284
Presidential Address, by Prof. G. W. O. Howe, on a Hundred Years of Electrical Engineering, 193. See 266
Railway Transportation in Canada, by Sir H. Thornton, 266
Engineering Problems and Traffic on the Great Lakes, by Lieut.-Col. H. S. Lamb, 266
Visit to Toronto Harbour and Filtration Plant, 266
Water-Power Resources of Canada, by J. B. Challies, 301. See 267
Queenston-Chippawa Development of the Hydro-Electric Power Commission of Ontario, by F. A. Gaby, 220*, 255*. See 267
Development of the St. Lawrence River for Power and Navigation, by R. S. Lea, 239*, 271*. See 267
Determination of Stress by Optical Methods, Joint Discussion with Section A, 284. See LETTERS, 462, 704, 769
Evidence for the Existence of an Endurance Limit in Metals and its Determination, by H. F. Moore and T. M. Jasper, 580*, 658*. See 284
Work of the Fatigue Panel of the Aeronautical Research Committee, by Prof. C. F. Jenkin, 245. See 284
Effect of High Temperature on the Range of Repetition Stresses on Steel, by Prof. F. C. Lea and H. P. Budgen, 500, 532*. See 284
Calculation of Quenching Stresses in Steel by Using Direct Measurements, by Prof. T. McL. Jasper, 285, 343*. See LETTER, 641
Large Deflection of Circular Plates, by Prof. S. Timoschenko, 286
Dimensional Problem and Significance of the Notched-Bar Impact Test, by Prof. H. P. Philpot, 286
Report of the Complex Stress Committee, 286. See 506
Engineers and Public Health, by F. A. Dallyn, 286
Bio-Aeration in Sewage Purification, by J. D. Watson, 241. See 286
Cobalt Magnet Steels, by E. A. Watson, 274*, 302*. See 286
Some New Recording Instruments, by R. S. Whipple, 287
Economical Design for Arch Centres, by A. E. Wynn, 257*

Section A.—Mathematical and Physical Science:
Programme, 98
Reports of Discussions, 320, 367, 409
Presidential Address, by Sir W. H. Bragg, on the Analysis of Crystal Structure by X-Rays, 349*, 428. See 368
Spectra of Ionised Elements, by Prof. A. Fowler, 321*
Critical Potentials and their Interpretation, by Dr. F. L. Mohler and Dr. P. D. Foote, 322
Band Spectra and the Structure of Molecules, by Prof. J. C. McLennan, 322
Spectrum of Titanium, by Prof. H. N. Russell, 322
Mechanism of Excitation, Ionisation and Dissociation in Statistical Theory, by R. H. Fowler, 322
Pulling Electrons from Metals by Intense Electric Fields, by Dr. R. J. Piersol, 322
Metastability of the Fundamental Coplanar Condition of the Helium Atom, by Dr. A. C. Davies, 322
Quantum Theory of the Scattering of X-Rays, by Prof. A. H. Compton, 322
Scattering of X and Gamma Rays and the Production of X-Rays by Photo-Electrons, by Prof. J. A. Gray, 323
Secondary and Tertiary Radiations, by Prof. W. Duane, 323
Recent Developments in Low-Temperature Research, by Prof. J. C. McLennan, 367
Controlled Orbital Transfers of Electrons in Optically Excited Mercury Atoms, by Prof. R. W. Wood, 367
Scattering of Light in Relation to the State of Molecular Aggregation, by Prof. C. S. Raman, 368
Relation between Crystal Structure and Refractive Index, by Prof. W. L. Bragg, 368
Chemical and Physical Significance of X-Ray Measurements of Compounds containing Long Chains of Carbon Atoms, by Dr. G. Shearer, 368
X-Ray Measurements as an Aid to Chemical Research by S. H. Piper, 368
Determination of Molecular Symmetry in Crystals and its Possibilities as a Method of Deriving Structural Formulæ, by W. T. Astbury, 368
Crystal Surface, by Prof. C. H. Desch, 368
Crystal Structure of Solid Argon, by J. E. Jones, 368
Atomic Disintegration, by Sir E. Rutherford, 368
Forces which Lift the Aeroplane, by Prof V. Bjerknes, 409
Meteorological Papers, 409

British Association—*continued.*

Section A.—Mathematics and Physical Science—continued.
Report of Committee on Local Variation of Earth's Gravitational Field, 410
Report of Committee on Seismological Investigations, 410
Correlation of the Records of two Distant Milne-Shaw Seismographs, by E. A. Hoigson, 410
Experiment Illustrating the Theory of the Green Flash, by F. J. W. Whipple, 410
Astronomical Papers, 410
Relation between Solar Activity and Terrestrial Magnetic Disturbance, by Rev. A. L. Cortie, 410
Spectra of Nebulæ, by Dr. H. H. Plaskett, 410
Wireless Time Signals, by M. Stewart, 410
Nature of Speech, by Sir R. Paget, 411
Research in Architectural Acoustics, by Prof. P. E. Sabine, 411

Section B—Chemistry:
Programme, 98
Reports of Discussions, 448, 480
Presidential Address, by Sir R. Robertson, on Chemistry and the State, 448
Activation of Nitrogen, by Prof. W. A. N. Bone, 448
Canadian Salt Company's Processes for the Manufacture of Alkali-Chlorine Products, by D. A. Pritchard, 448
Electrolytic Nickel Processes, by R. L. Peek, 448
Resistor Furnaces, by F. A. J. Fitzgerald, 449
Economic Aspects of the Hydro-Metallurgical Development in Relation to Canadian Natural Resources, by H. Freeman, 449
Characteristics of Electric Steam Generation, by F. A. Lidbury, 449
Liquid and Powdered Fuels, Joint Discussion with Section C (Geology), 480
Liquid Fuels in Canada, by Dr. G. S. Hume, 480
Advantages of Pulverising Fuels, by H. D. Savage, 480
Pulverised Coal for Metallurgical Plants, by Prof. G. A. Guess, 480
Brown Coals and Lignites, by Prof. W. A. Bone, 480
Colloids, Joint Discussion with Section A, 480
"British Aviator," Motor Tanker, Trials, 236, 369
British Broadcasting Co., Ltd., Chelmsford Transmitting Station, 494*
— Cast-Iron Research Association, 707
— Cold Storage and Ice Association. See *Cold Storage*
— Columbia, Dry Dock at Esquimalt, 449*
— Corporation, Shipbuilding Rules, 738
— Electric Plant Co., Ltd., Centrifugal Pumps, 625*
— Empire, Air Communications, 450
— — Cement Manufacture, 381

British Empire Exhibition:

Conferences, &c.:
Empire Mining and Metallurgical Congress, 243
Illuminating Engineering Society, 259
Institute of Transport Congress, 450
See also *Ceramic Society*; *Iron and Steel Institute*; *World Power Conference*

Electrical Exhibits:
Capstan, Electric (Vickers, Ltd.), 502*
Motor Starters and Regulators (Brookhirst Switchgear, Ltd.), 580*
Railodok Electric Passenger Cars, 198
Recording Instruments (Everett, Edgcumbe & Co., Ltd.), 207*
Substation Equipment, Automatic (British Thomson-Houston Co., Ltd.), 13*; (Peebles-Reyrolle), 323*
Switchgear (Erskine, Heap & Co., Ltd.), 106*; (Ferguson-Pailin, Ltd.), 468*
— and Induction Regulators (Switchgear & Cowans, Ltd.), 180*
Temperature Control, Automatic, Cambridge Instrument Co., Ltd., Electric Furnaces, 451*; Gas Furnaces and Steam Heating, 628*
Transverter for High-Tension, Direct-Current Power Transmission, 14

Engineering Exhibits:
Air Compressor, Five-Stage, Charging Compressed-Air Locomotives (Belliss & Morcom, Ltd.), 498*
— — High-Pressure Marine Type (G. & J. Weir, Ltd.), 425*
— — and Petrol Engine, Combined, Portable (Broom & Wade, Ltd.), 179*
— — Vertical Two-Stage, Steam-Driven (Browett, Lindley & Co., Ltd.), 690*
— Preheater for Boiler Furnaces (E. Green & Sons, Ltd.), 209*
Boiler, Vertical, Cochran, for Oil Fuel, 501*
Boring Cutter, S. R. (Vickers Ltd.), 99
Coal-Measuring Apparatus, Boiler Furnaces (E. Allen & Co., Ltd.), 242*; (Lea Recorder Co., Ltd.), 598*
Engines, Internal-Combustion, Synchro-Balance System (Blackstone & Co., Ltd.), 593*. See 22
— Oil, 300-h.p., Horizontal, Cold-Starting (Blackstone & Co., Ltd.), 638*. See 21, 60*
— — Marine, 96-h.p., Four-Cylinder, Hot-Bulb Type (Norris, Henty & Gardners, Ltd.), 595*
— — 18-h.p., Single-Cylinder, Hot-Bulb Type (Norris, Henty & Gardners, Ltd.), 595*
— Steam, Compound, Vertical High-Speed, and 100-kw. Generator (Browett, Lindley & Co., Ltd.), 305*

British Empire Exhibition—*continued.*

Engineering Exhibits—continued.
Pumps, Air, Contraflo Reciprocating (Vickers Ltd.), 573*
Refrigerating Machinery, 559*, 594*
Lubrication Tell-Tales (Hawthorn, Leslie & Co., Ltd.), 422*
Oil-Fuel Burning Apparatus, Wallsend-Howden System, 345*
Screw Thread-Grinding Machine (Wolseley Motors, Ltd.), 547*
Turbines, Hydraulic, and Oil-Pressure Governor (J. J. Armfield & Co., Ltd.), 610*
—Steam, 5,000-kw., Brush-Ljungström, 71*
Water Recorder, V-Notch (Lea Recorder Co., Ltd.), 598*
Winches, Boat and Cargo, Williams-Janney Variable-Speed Gear (Vickers, Ltd.), 211*

Fire-Protection Appliances:
Chemical Fire Extinguisher, Konus Kemik, 530
Fire Protection Service at the Exhibition, 153*, 383*, 426*. See 530*
— Pumps, Trailer Type (Gwynnes Engineering Co., Ltd.), 147*; (Dennis Brothers, Ltd.), 426*; (Merryweather & Sons, Ltd.), 426*; (Martin's Cultivator Co., Ltd.), 428*
Motor Fire Engine (Dennis Brothers, Ltd.), 383*
— — Engine, Froth Producing, Oil Fires (Merryweather & Sons, Ltd.), 530*
— — Engine, Hatfield Pump (Merryweather & Sons, Ltd.), 156*
— — Engine, Rees Roturbo Pump (Leyland Motors, Ltd.), 156*
— — Engine (Stanley Fire Engine Co.), 386*
Pumps, Centrifugal, Four-Stage, Fire Protection (Worthington-Simpson, Ltd.), 153*
— Fire and Salvage, Steam-Driven (Merryweather & Sons, Ltd.), 531*

General:
Canadian Exhibit, 137*. See LETTER, 334
Colliery, Equipment of, 49*, 159*, 190*, 224*, 251*, 338*, 411*, 528*. See 622*
Indian and Burmese Exhibits, 507*, 537*. See LETTER, 548
New Zealand Exhibits, 287*
Results of the Exhibition, 615
South African Exhibit, 172*, 204*

Metallurgical Exhibits:
Chains and Anchors (Earl of Dudley's Round Oak Works, Ltd.), 100
Coke Ovens, Piette System, Shelton Iron Works, 510*
Drop Forgings (Vickers Ltd.), 100
Gear Wheel, Double Reduction, for Marine Geared Turbine (Vickers Ltd.), 100*
Non-Ferrous Metals Exhibits, 335
Pressed-Steel Work (Vickers Ltd.), 99
Railway and Tramway Rails (Cammell Laird & Co., Ltd.), 438; (Dorman, Long & Co., Ltd.), 440
— Tyres and Axles (Vickers, Ltd.), 99; (Cammell Laird & Co., Ltd.), 438
— Wheels (Newlay Wheel Co., Ltd.), 438
Spring Manufacture (Vickers Ltd.), 99
Standard Specimens for Steel Analysis (Ridsdale & Co.), 439
Steel Castings (Cammell Laird & Co., Ltd.), 438
— — for Gas Producer (Steel Co. of Scotland), 439*
— — Rudder Frame, H.M.S. "Hood," 189*
— — Vikro Heat Resisting, 99
— High Tensile, Ducol (D. Colville & Sons, Ltd.), 100
— Pipes and Tubes (Vickers Ltd.), 99; (Stewarts & Lloyds, Ltd.), 439; (J. Russell & Co., Ltd.), 439
— Plates and Sections (Steel Co. of Scotland, Ltd.), 439; (Dorman, Long & Co., Ltd.), 440
— Vibrac (Armstrong, Whitworth & Co., Ltd.), 187*. See *Errata*, 423
Structural Steelwork (Dorman, Long & Co., Ltd.), 440
Turbines, Hydraulic, Rotors for (Vickers Ltd.), 100*
Wire Ropes (Wilkins Wire & Wire Ropes, Ltd.), 439

Miscellaneous Exhibits:
Agricultural Machinery Exhibits, 382, 516*
Coffee-Preparing Machinery (E. H. Bentall & Co., Ltd.), 541*
Diving Dress, Self-Contained (Siebe, Gorman & Co., Ltd.), 149*
Manometer, Balanced, for Gas-Flow Measurements (G. Kent, Ltd.), 223*
Palm-Oil Extraction Plant for Nigeria (Manlove, Alliott & Co., Ltd.), 513*
Plough, Four-Furrow Anti-Balance, for Cable Ploughing (J. Fowler & Co. (Leeds), Ltd.), 516*
Respirators for Use in Noxious Gases (Siebe, Gorman & Co., Ltd.), 149*
Thomas Gas Meter (Cambridge Instrument Co., Ltd.), 182*. See *Errata*, 262
Wooden Box Manufacture, Nailing and Printing Machines (M. Wylie & Co., Ltd.), 544*

Naval Exhibits:
Armour Plates, Beardmore, 187*; Hadfield, 189
Boilers, Water-Tube, Yarrow, Warship Propulsion, 458*
Coastal Motor Boats, Thornycroft, 421*
Docks, Floating (Swan, Hunter & Wigham Richardson, Ltd.), 460
Guns, Armstrong, Whitworth, 185*; Beardmore, 188*
— Boats, Shallow-Draught, Yarrow, 459

British Empire Exhibition—*continued.*

Naval Exhibits—continued.
Guns, Mountings, Swashplate Engine (Armstrong, Whitworth & Co., Ltd.), 187*
Hospital Ship, Shallow-Draught Motor, the "Nabha," 421*
Mine-Sweeping Sloops (W. Simons & Co., Ltd.), 460
Projectiles, Armour Piercing, Hadfield, 189*
Sealed Type Motor Boat, 460*
Steamers, Shallow-Draught, Propulsion, Yarrow Flap System, 459*
Torpedo Boats and Destroyers, Thornycroft, 420; Hawthorn, Leslie & Co., Ltd., 421; Yarrow, 459; Swan, Hunter & Wigham Richardson, Ltd., 460; Vibrac Steel, Armstrong, Whitworth & Co., Ltd., 187*. See *Errata*, 423
Warship Construction, Armstrong, Whitworth & Co., Ltd., 187; J. Brown & Co., Ltd., 189; Hawthorn, Leslie & Co., Ltd., 421; Swan, Hunter & Wigham Richardson, Ltd., 460

Pumps and Pumping Machinery:
Pump, Air, with Ejector Augmentor, Paragon (G. & J. Weir, Ltd.), 217
— Centrifugal, Boiler-Feed, Geared-Turbine Drive (British Electric Plant Co., Ltd.), 626*
— — Boiler-Feed, Turbine-Driven (G. & J. Weir, Ltd.), 216*; (Gwynnes Engineering Co., Ltd.), 218*
— — Emergency Bilge (Gwynnes Engineering Co., Ltd.), 2*; (Drysdale & Co., Ltd.), 217*
— — Extraction, for Condensing Plant (Mirrlees, Watson Co., Ltd.), 5*; (Drysdale & Co., Ltd.), 217*
— — Four-Stage High-Lift (Gwynnes Engineering Co., Ltd.), 2
— — Low-lift, for Circulating Water (Mirrlees, Watson & Co., Ltd.), 5*
— — Low-Lift, Submerged, for Irrigation (Gwynnes Engineering Co., Ltd.), 3*
— — and Petrol Engine, for Salvage Work (Drysdale & Co., Ltd.), 218*
— — Sewage, Gwynne-Pennell Rotary Trap, 218*
— — Single-Stage (British Electric Plant Co., Ltd.), 627*
— — Six-Stage, Electrically-Driven, (British Electric Plant Co., Ltd.), 625*
— — (Tangyes, Ltd.), 5
— — Two-Stage, High-Lift (Mirrlees, Watson Co., Ltd.), 5*
— Horizontal Duplex, for Cargo Oil (Hayward-Tyler & Co., Ltd.), 5*
— — Duplex, with Twells Valve Gear (Hayward-Tyler & Co., Ltd.), 3*
— Reciprocating, Two-Throw, Electrically-Driven (G. & J. Weir, Ltd.), 216*
— Rotary Gear Type, for Oil Fuel (Hayward-Tyler & Co., Ltd.), 5
— Vertical Duplex (Hayward-Tyler & Co., Ltd.), 5*
— — Duplex, Piston Cooling, Diesel Engine (Hayward-Tyler & Co., Ltd.), 5*

Railway Material:
Bogie, Four-Wheeled, Double-Bolster (Leeds Forge Co., Ltd.), 280*
Carriage, Railway, Control Trailer Car, Metropolitan Railway, 9*
— — Pullman Buffet Car, 7
— — Steam Motor, Sentinel-Cammell, 6*. See *Errata*, 133
— Royal Saloon, Egyptian State Railways, 475*
— Third-Class Vestibule, London, Midland and Scottish Railway, 160*
Coupling, Automatic, Willison Central-Buffer Type, 478
Locomotive, 4-8-0 Type, Three-Cylinder Superheater, Buenos Ayres Great Southern Railway (Armstrong, Whitworth & Co., Ltd.), 280*
— Feed-Water Heater and Pump (Worthington-Simpson, Ltd.), 478*
— Geared Turbine, Reid-MacLeod, 479*
Lubricator, Mechanical, for Locomotives (Gresham & Craven, Ltd.), 163*
Roller Bearings, Railway Signalling, 9
Rubber Applications in Railway Work (Spencer, Moulton & Co., Ltd.,), 9*
Signalling, Railway, Tyer One-Wire, Three-Indication Block Instrument, 10*
— — Tyer Key Token Instrument for Single-Line Working, 10*
— — Long-Burning Oil Lamp, 9
— — Westinghouse Double-Wire System, 163*
Wagon, Coal, 42-ton Hopper, Bengal, Nagpur Railway, 279*

Scientific Exhibits:
National Physical Laboratory, Exhibits: Metrology Section, 129*; Physics Section, 278*

Textile Machinery:
Cotton-Preparing, Spinning and Weaving Machinery, 11*, 89*, 247*

British Empire, Power Production, Financial Considerations, 35
— — Power Resources, 18, 31
— Engine Boiler and Electrical Insurance Co., Ltd., Report on Machinery Failures, 417. See LETTERS, 486, 548
— Engineering Standards Association. See *Engineering Standards*
— Guiana, Fairey Ambulance Seaplane, 593
— Industries Fair, Birmingham, 524
— Liquid Meter Co., Ltd., Bassier Meter, 497*
— Navy. See *H.M.* under *Warships*
— Railways. See *Railways*
— Shipbuilding. See *Shipbuilding*
— Shipping. See *Shipping*
— Standard Rails and Sections, British Empire Exhibition, 440
British Thomson-Houston Co., Ltd., Automatic Substation Equipment, 13*, 227*; Alternators, Switchgear, &c., Newfoundland Water Power Plant, 127*; Tests of 15,000 kw. Turbo Generator, 704; Manufacture of Head-Band Telephones, 747*; Control Gear, Electric Winding Engine, Penang Hills Railway, 852*. See 789*
— Trade. See *Trade*
— Water Works Association. See *Waterworks*
Broaching Machine. See *Machine Tools*
Broadcasting. See *Telephony, Wireless*
Bronze, Aluminium, Properties and Uses, United States, 376
— Cold Rolling-Mill Bearings, 601
— Exhibits at British Empire Exhibition, 335
— High Tin, Effect of Casting Temperature and Heat Treatment, 409, 430*
Brook, G. B., on Determination of Sodium in Aluminium, 409
Brooke, J. W., & Co., Ltd., Marine Petrol Motor, 815*
Brookhirst Switchgear, Ltd., Motor Starting and Control Panels, 447, 580*
Brooks & Doxey (1920), Ltd., Cotton Spinning Machinery, 90*
Broom & Wade, Ltd., Air Compressors, 179*, 191*, 766*
Broomaster Portable Air Compressor, 179*
Browett, Lindley & Co., Ltd., High-Speed Steam Engine, 305*; Air Compressors, 690*; Gas Engine, 847*
Brown Coal, Morwell Power Scheme, Electrically Operated Excavator, 299*
— — Occurrence and Use, 480
Brown, D., & Sons (Hudd.), Ltd., Worm-Gear Testing Machine, 823*
Brown, J., & Co., Ltd., Naval Construction Exhibits, British Empire Exhibition, 189; Launch of S.S. "Oronsay," 264
Brown, Lieut.-Col. W., the Late, 653
Brown & Sharpe Gear Testing Machine, 696*
Brown-Boveri Mercury-Vapour Rectifier Substations, 782*. See 845*
Bruce, Sir D., on Prevention of Disease, 265
Brush Electrical Engineering Co., Ltd., Brush-Ljungström Turbo-Generator, British Empire Exhibition, 71*; Manufacture of Brush-Ljungström Turbines, 699*; Brush-Ljungström Turbo Generators, St. Pancras Power Station, 642*
Buck & Hickman, Ltd., Adjustable Wrenches and Spanners, 113*
Budgen, H. P., on Repetition Stresses, 500, 532*. See 284
Buenos Ayres Great Southern Railway, Locomotive, 280*
Buffet Car, Pullman, British Empire Exhibition, 7
Buildings, Acoustic Properties, Research in, 411
— Electrical Equipment, Regulations, 202
— Wind Pressure on, Measurement, 800
Bulawayo, Use of Electric Power, 85
Buoyant Apparatus, Life-Saving, New Regulations, 587
Bureau of Mines. See *United States*
— of Shipping. See *United States*
— of Standards. See *United States*
Burford, H. G., on Road Conditions and the Development of Motor Vehicles, 87, 874*
Burge, W. S., on Pass-Out Turbines, 744
Burmah Shale Oil Distilling Plant, 538*
Burmese Exhibits, British Empire Exhibition, 507*, 537*. See LETTER, 548
Burners, Oil Fuel, See *Oil Fuel*
Burnt Oak Automatic Substation, 227*
Butler Machine Tool Co., Ltd., Shaping Machines, 360*; Planing Machine, 362*; Slotting Machines, 363*
Butt Welding Machine (A.1 Electric Welding Appliances Co.), 827*
Butterley Company, Ltd., Coal-Washing Plant, 411*

C.

CABLE-LAYING Steamer "Edouard Suenson," 196*, 269*
— Ploughing Tackle, Fowler's, 382. See 516*, 807
— Railway, Penang, 664*, 726*, 789* 852*
— Works, Henley's, Laboratories, 736*
— See also *Wire Ropes* and *Electric*
Cadmium Light, Wave Length, Calibration of Standard Metre, 491*
Caeg Electric Safety Lamps, Miners, 529
Calcium Chloride Breathers, Transformers, 802*
Calcutta Water Supply, 178
Calendar, Simplified, Plea for, 410
Calorific Value, Coal, and Boiler Trials, 55. See LETTERS, 101
Cambrian Wagon Co., Ltd., 20-ton Steel Railway Wagon, 766
Cambridge Instrument Co., Ltd., Thomas Gas Meter, 182*. See *Errata*, 262; Recording Instruments, 287; Automatic Temperature-Control Apparatus, 451*, 628*; Clink Detector, Steel Forgings, 658*
Camellaird-Fullagar Diesel Engine, Piston Withdrawal, 145*; Trials of M.S. "British Aviator," 236, 369
Cammell Laird & Co., Ltd., Steam Railway Motor Coach, 6*. See *Errata*, 133: Railway Exhibits, British Empire Exhibition, 279*; Metallurgical Exhibits, British Empire Exhibition, 438; Willison Automatic Coupling, 478
Canada, Electric Power Transmission and Distribution, 78
— Engineering Problems, Traffic on Great Lakes, 266
— Fuel Resources, 38, 480. See LETTER, 102
— Manufacture of Alkali-Chlorine Products, 448
— Montreal Docks, Electric Locomotives, 746
— Power Resources, 19, 31. See 78
— Railway Transportation in, 141*, 266, 540
— River St. Lawrence, Dredging Work, 438. See *Erratum*, 486; Development for Power and Navigation, 239*, 271*. See 267

Canada, Toronto International Mathematical Congress, Hon. Sir C. A. Parsons on the Steam Turbine, 469; Prof. Sir J. B. Henderson on Teaching Mathematics, 491
— — Meeting, British Association. See *British Association*
— Wood-Pulp and Paper Making Industry, 539
Canadian Bridge Co., Designs for Sydney Harbour Bridge, 129*. See 169, 198*
— Electro-Chemical Industries, 448
— Exhibit, British Empire Exhibition, 137*. See LETTER, 334
— Government Dry Dock, Esquimalt, 449*
— Ingersoll Rand Company, Compressors, 138*
— Railways, British Empire Exhibition, 141*
— Timber Resources, 539
— Water Power, Development of River St. Lawrence, 239*, 271*. See 267, 438, 486
— — Power and the Electro-Metallurgical Industries, 449
— — Power, International Joint Commission, 37
— — Power, Queenston-Chippawa Development, 220*, 255*. See 267
— — Power Resources, 43, 301, 506. See 267
Canal Construction, Queenston - Chippawa Hydro-Electric Development, 221*
— Panama, Report on Working, 745
— — Ten Years' Operation, 491
— Suez, Proposed Deepening, 457
— See also PARAGRAPH INDEX
Cantilever Bridge. See *Bridge*
Capacity. See *Electric*
Capital and Labour. See *Labour*
Capstan, Electric (Vickers Ltd.), 502*
— Lathe. See *Lathe* under *Machine Tools*
Carbon Dioxide Compressor, High-Speed, Refrigerating Plant, 559*
— — Refrigerating Plants. See *Refrigerating*
— Monoxide-Air Explosions, Activation of Nitrogen, 448
— — Removal from Town Gas, 23
Carbonisation, Seaweed, Fuel Research Board, 233
Carburetted Water Gas. See *Gas*
Carburettor Manufacture, Iron Casting in Metal Moulds, 377
Carburisation. See *Heat Treatment* under *Metallurgy*
Cardiff Engineering Exhibition, 747, 766*, 808
Carding Machines for Cotton, 89*
Carels Diesel Engine, Improvements in, 544*
Cargo Oil Pump (Hayward-Tyler & Co., Ltd.), 5*
— Steamers. See *Steamers*
— Winch, Williams-Janney Gear, 211*
Carothers, S. D., on Earth Stresses, 1*, 156*
Carriage, Kitchen, Electrically-Equipped, London & North Eastern Railway, 480*
— Passenger, Penang Hills Railway, 728*
— Railway, Control Trailer Car, Metropolitan Railway, 9*
— — Four-Wheeled Double-Bolster Bogie, 280*
— — Pullman Buffet Car, British Empire Exhibition, 7
— — Repair, Petrol, Four-Wheel Drive, 817*
— — Steam Motor, Sentinel-Cammell, 6*. See *Errata*, 133
— Royal Saloon, Egyptian State Railways, 475*
— Third-Class Vestibule, London Midland & Scottish Railway, 160*
Cars, Dynamometer, Electrical Recording Instruments, 208*
— Motor. See *Motor Cars*
— Passenger, Accumulator, British Empire Exhibition, 198
Carter, G. F., on the Duties of Municipal Engineers, 24
Cartridge Cold Starter, Petter Oil Engine, 721*
Carus-Wilson, Professor C. A., on Science Teaching in Technical Schools, 865
Carville Power Station, Comparisons with North Tees, 57*
Cascade System, Feed Heating. See *Feed Water*
Casein Products, New Zealand Dairy Industry, 289
Cask Washing Machine, Brewers' Exhibition, 649
Cast Iron Pots, Piston Rings, Specification, 583
— — Production from Steel Scrap, 276
— — Research Association, British, 707
Castings, Brass, Standard Specifications, 261
— Iron, Influence of Titanium, 113
— — Production in Cast-Iron Moulds, 377
— — and Steel, Motor-Car Manufacture, Standard Specifications, 176
— Steel, British Empire Exhibition, 99, 189*, 438, 440
— — Rudder Frame, H.M.S. "Hood," 189*
— — Vikro Heat-Resisting, 99
— Temperature, Admiralty Gun Metal, Effect on Properties, 436*. See 409
— — Bronze, Effect on Properties, 409, 430*
Catalogues, 33, 113, 151, 183, 214, 244, 306, 470, 502, 534, 564, 627, 660, 692, 754, 787, 820, 877. See PARAGRAPH INDEX
Catchment Areas, Run-off, Storage and Allocation, 42
Caterpillar Tractor. See *Tractor*
Cathcart, A. B., on Underground Water Supply, 151
C.A.V. Small Tools, Ltd., Wade Screw-Cutting Lathe, 749*
Cavitation Investigations, United States Warships, 717*. See LETTER, 769
Cedars Rapids Hydro-Electric Power Plant, 239*. See 267, 271
Celluloid Models, Stress Determination by. See *Optical*
Cement, Ferrocrete Quick-Hardening, Tests, 867
— High Alumina (Ciment Fondu), Use for Reinforced Concrete Piles, 739
— Manufacture, British Empire, 381
— See also *Concrete* and PARAGRAPH INDEX
Cementation. See *Heat Treatment* under *Metallurgy*
Census of Road Traffic, 837
Centenary Celebrations, Franklin Institute, 745
Central Station. See *Power Station*
Centreless Grinding Machines, 404*
Centrifugal Pumps. See *Pumps*
— Separator, Oil Purification, Monarch, 274*
— Stresses, Rotating Discs, Conical Profile, 418. See LETTER, 486
Centring, Timber, Ferro-Concrete Arch Bridge, 257*
Ceramic Society (Refractory Materials Section): Comparison of Gas and Coke-Fired Drying Stoves, by T. W. Barley, 460; Properties of Clay-Sillimanite Mixtures, by H. S. Houldsworth, 461; Influence of Exposure on the Chemical and Physical Properties of Certain Fireclays, by W. Hugill and W. J. Rees, 481; Alumina-Silica Minerals in Firebricks, by W. J. Rees, 481; Note on the Storage of Silica Refractories, by W. J. Rees, 481; Rapid Method for the Determination of True (or Powder) Specific Gravity by W. Hugill and W. J. Rees, 482; Specific Gravity and After Expansion of Lime-Bonded Silica Bricks, by W. J. Rees, 482
"Ceres," H.M.S., Model, British Empire Exhibition, 189
Ceylon, Aberdeen-Laxapana Water Power Scheme, 473*
— Colombo Harbour, Future Depth, 457
Chains and Anchors, British Empire Exhibition, 100
— Driving, Renold Steel Hollow-Stud, 260*
— Mortising Machine, 23*
— Track Tractor. See *Tractor*
Challies, J. B., on Water-Power Resources of Canada, 301. See 267
Chamber of Shipping, Report on Port Facilities, 715
Change-Speed Gear. See *Gear; Motor-Car Details*
Channels, Water, Automatic Intake Control, 432*
Charcoal, Conductivity of, Electric Iron Smelting, 637
Charging Machine, Coke Ovens, Shelton Iron Works, 512*
Charing Cross to Kennington Extension, Underground Railways, 328
Chatham Dockyard and Hospital, Automatic Telephone Exchange, 373
Chelmsford Transmitting Station, British Broadcasting Co., Ltd., 494*
Chemical Analysis. See *Analysis*
— Engineering Laboratory, University College, London, 682
— Engineers, Institution of, Dr. W. M. Travers on Tests of Water Gas Plants, 682
— Fire Extinguisher, the Konus Kemik, 530
— Industry, Society of, Dr. A. van Rossem on the Chemistry and Uses of Rubber Latex, 776; (Chemical Engineering Group), Development and Formation of Crystals, by T. V. Barker, 738; Mechanical Crystallisation, by H. Griffiths, 738
— Salts, Crystallisation from Solutions, 738
— Works, Report on, 127
Chemistry, Acidity of Raw Rubber, 334
— Activation of Nitrogen, Gaseous Explosions, 448
— Alcohol, Dehydration by Glycerin, 344
— Alkali-Chlorine Products, Canadian Manufacture, 448
— of Colloids, British Association Papers, 480
— of Corrosion. See *Corrosion*
— Crystals, Natural History of (Review), 631
— — Structure, Analysis by X-Rays, 340*, 368, 428
— Determination of Sodium in Aluminium, 409
— Nitrogen Fixation, Report, 116
— Oxygen Determination in Pure Iron, 366
— Physical, Formation of Igneous Rocks, 588
— of Rare Elements (Review), 336
— and the State, 448
— Synthetic Ammonia Manufacture, Franco-German Agreement, 263. See 372
— — Ammonia Manufacture, Recent Developments, 263. See 372
— Testing Volumetric Glassware, 378
— See also PARAGRAPH INDEX
Chesapeake and Ohio Railroad, Mallet Simple Locomotive, 795*, 860*
Chester Waterworks Pumping Station, Remote Control, 671*
Chicago Power Station, 50,000 kw. Turbo Generator, 66*. See 45
China, Power Resources, 33. See 19
Chittenden, J. P., on Pass-Out Turbines, 744
Chlorination Plant, Water Supply, Egyptian Towns, 736
Chlorine Products, Canadian Manufacture, 448
Christiania, Electric Power Supply, 85
Chuck. See *Machine Tools*
Churchill, C., & Co., Ltd., Chucking Machine, 400*; Lees-Bradner Gear Grinder, 402*; Cincinnati Centreless Grinder, 404; Five-Spindle Automatic Machine, 442*
Churchill Machine Tool Co., Ltd., Grinding Machines, 405
Ciment Fondu, Advantages for Ferro-Concrete Piles, 739
Cincinnati Centreless Grinding Machine, 404
Cinematograph. See *Kinematograph*
Circuit Breaker. See *Switchgear*
Circular Plates, Deflection of, 286
— Saws. See *Saws* under *Machine Tools*
Circulating Pumps. See *Pumps*
Circulation Theory, Aviation, and the Flettner Rotor Ship, 710, 770. See LETTER, 831*
City and Guilds Engineering College, Tests of Quick-Hardening Cement, 867
— and South London Railway, Tunnel Enlargement, 640; Re-opening, 775
Civil Aerial Transport. See *Aeronautics*
— Engineering of Water Power, 44
— Engineers, French Society, M. de Boulongue, on Repairs of La Voulte Viaduct, 557

Civil Engineers, Institution of:
Standard Test Code for Hydraulic Power Plants, Discussion, 51
James Forrest Lecture on Electrical Progress and its Unsolved Problems, by Prof. E. Thomson, 56
Committee on Heat Engine and Boiler Trials, General Scope and Objects of Work, by Capt. H. R. Sankey, 55. See LETTER, 101

Civil Engineers, Institution of—*continued.*
Kelvin Centenary, 97. See 104
Economic Position of Great Britain, Address by E. Crammond, 617
Presidential Address by B. Mott, on Metropolitan Engineering, 640. See 647. See LETTERS, 676
Modern Practice in Road Making, by W. J. Hadfield, 692
Water Supply to the Smaller Provincial Towns of Egypt, by R. H. L. Pennell and H. Addison, 735
Report of Committee on Deterioration of Structures in Sea Water, 774
Measurement of Wind Pressure on Structures, by Dr. T. E. Stanton, 800
Standards of Comparison in Connection with the Thermal Efficiency of Steam Engines, by Capt. H. R. Sankey, 818*. See 835, 866*
Clarke, Engineer-Commander W. H., the Late, 622
Class Warfare, Futility 681. See LETTER, 746
Claude Process, Synthetic Ammonia, Recent Developments, 263. See 372
Clay, London, Properties of, 640, 641, 647. See LETTER, 676
— Fire. See *Firebricks; Refractory Materials*
Clayton Electric Vehicles, 689*. See 719
Cleaning Machines for Cotton, 12*
— Water Mains, Victaulic Pipe Joints, 14
Clearance Volume, Engine Cylinders, Determination, 101*
Cleveland Iron Prices. See *Metal-Price Diagrams*
— and the Northern Counties, Notes from, 15, 53, 95, 133, 167, 199, 229, 261, 291, 329, 373, 415, 453, 487, 519, 549, 583, 613, 645, 676, 707, 738, 771, 802, 833. See PARAGRAPH INDEX
Climate of Polar Regions, 863
— See also *Meteorological*
Climax Dobby, Cotton Weaving, 248*
Climax Rock Drill and Engineering Works, Ltd., Rock Drill and Percussion Coal Cutter, 528*
Clink Detector, Steel Ingots and Forgings, 658*
Clinker Formation, Boiler Furnaces, 548
Cloth Folding and Measuring Machine, 250*
Cloud Drops, Formula for Diameters, 592
— and Skies, Photometric Observations, 592
Clutches, Hydraulic, Change-Speed Gear, Oil Engine Locomotive, 702*
— — Föttinger, Diesel Engine Drive, M.S. "Vulcan," 92*, 369*
— Reversing, Wiberg, Geared Turbines, 120, 144*
— See also *Motor-Car Details*
CO_2. See *Carbon Dioxide*
Coach, Motor, Railway, Steam, Sentinel-Cammell, 6*. See *Errata* 133
— Railway. See also *Carriages*
Coal, British Prices and United States Exports, 518, 521
— Brown, Morwell Power Scheme, Electrically-Operated Excavator, 299*
— — Occurrence and Use, 480
— Calorific Value, and Boiler Trials, 55 See LETTERS, 101
— Consumption, Electric Power Stations, 377
— — See also *Trials*
— — St. Pancras Power Station, Parsons' Line, 642*
— Conveyor, Colliery Workings, 226*
— Co-ordination of Supplies, 82
— Cost of, and Mining Royalties, 294
— Cutting Machines, British Empire Exhibition Colliery, Mavor & Coulson Disc Type, 225; Mavor & Coulson Arcwall Chain Type, 225*; Mavor & Coulson Universal Bar Type, 225; Diamond Chain Type, 225; Siskol Percussion Type, 225*; Climax Percussion Type, 528*
— — Machines, Cardiff Engineering Exhibition, 766
— Economy. See also *Fuel Economy; Pulverised Coal*
— Gas. See *Gas.*
— Handling, Bennis Automatic Conveyor, 766
— — Lakeside Power Station, Costs, 592
— Hydrogenation of, 38, 777
— Industry, Belgian, Statistics, 838
— Lancashire, Arley Seam, Fuel Research Board Investigations, 552
— Low-Temperature Carbonisation and Fuel Economy, 38, 82, 777
— — Temperature Carbonisation, Fuel Research Board, 232
— — Temperature Carbonisation, Maclaurin Plant, Dalmarnock Gasworks, 491, 682
— — Temperature Carbonisation, Parker Plant Trials, 588*
— — Temperature Carbonisation, Tests of Arley Seam Coal, 553
— Measuring Apparatus, Boiler Furnaces (E. Allen & Co., Ltd.), 242*; Lea, Internally Fired Boilers, 598*
— Mine. See *Colliery*
— Miners, Health of, 294
— Mining Industry, Economics, 518* 521
— — Proposed Control, Report, 293
— Physical and Chemical Properties, Survey, 232. See 19, 31, 552
— Production Costs and Output, 521. See 518*
— Pulverised. See *Pulverised Coal*
— Resources, Canadian, 137
— — of the World, 19, 31
— Screening Plant, British Empire Exhibition Colliery, 340*
— Steamers, with Unloading Conveyors, Great Lakes, 723*. See *Erratum*, 863
— Washing Plant, Rheolaveur, British Empire Exhibition Colliery, 411*
— See also PARAGRAPH INDEX
Coalfield, Ulster, Development, 175
Coalite. See *Coal, Low-Temperature Carbonisation*
Coast Defence Measures, French, Report, 170
Coastal Motor Boats, Thornycroft, British Empire Exhibition, 421*
— Shipping, Position and Prospects, 774
Coating, Metallic, Spraying Process, 409
Cobalt, Electro-Deposited, Hardness of, 599
— Steel, Permanent Magnets, 274*, 302*. See 286
Cochran & Co. (Annan), Ltd., Oil-Fired Boiler, 501*
Cockcroft, J. D. Harmonic Analyser, 651. See 876*
Coe, R. T., Harmonic Analyser. 651. See 876*
Coffee-Preparing Machinery, British Empire Exhibition, 541*
Coinage, Working of Nickel for, 378
Coke, Conductivity of, Iron Smelting, 637
— Conveyor, Belt, the Robins, 512*
— Fired Drying Stoves, Comparisons with Gas Firing, 460
— Fuel for Steam Raising, 40, 82
— Ovens, Piette, Shelton Iron Works, 510*
Coker, Prof. E. G., on Optical Determination of Stress, 284. See LETTERS, 462, 704, 769
Coking, Low-Temperature, of Coal. See *Coal*
— Stoker. See *Stoker*
Colchester Bathe Co., Lathes, 356*, 401*
Cold Rolling, Effect on Hardness of Copper, 386*, 408
— — Mills, Design and Lubrication of Bearings, 569*, 601*, 636*. See LETTER, 769*
— — Mills, Michell Radial Bearings, 769*
— Saw. See *Machine Tools*
— Starter, Cartridge, Petter Oil Engine, 721*
— Starting Oil Engine. See *Engine, Oil*
— Storage, Fruit Transport, Rail and Sea, 743*
— — and Ice Association, British, Dr. E. Griffiths on Refrigeration Research, 742*
— — See also *Refrigeration*
— Stores, Heat Insulating Materials, Conductivity Tests, 742*
— Work, Effect in High-Temperature Tensile Tests of Wires, 408
Coleraine, Ireland, Strauss Bascule Bridge, 758*
Collapsible Boat, the Collet, 843*
College. See *Education*
Collet Folding Boat, 843*
Collieries, Caeg Electric Safety Lamps, 529
— Electric Light Fittings for, 529*
— — Shock Fatalities, 243
— Materials for Stone Dusting, 675. See 808
— Portable Air Compressor for, 766*
— Safe Use of Electricity, 243. See 808
— Stone Dusting Machine for, 808. See 675
— Use of Explosives, Statistics, 291
Colliery at British Empire Exhibition, 49*, 159*, 190*, 224*, 251*, 338*, 411*, 528*. See 622*
— Haulage, Compressed-Air Locomotives, Compressor for Charging, 498*
— — Gear. See *Haulage*
— Industry, Co-operation in, 293, 585
— — Mining Royalties and Cost of Coal, 294
— — Proposed Control, Report, 293
— Lamp, Electric, with Turbine-Driven Generator, 530*
— Lighting. See *Safety Lamps.*
— Plant, Coal-Cutting Machines. See *Coal Cutting*
— — Exhibition, Cardiff, 747, 766*, 808
— — Pit Prop Withdrawing Appliance, 528*
— Requisites, Standardisation, 815
— Tubs, Creepers and Tipplers, Coal-Screening Plant, 338*
— — Gate-End Conveyor for Loading, 227*
— — Weighing Machine for, 338
— Ulster, Development, 175
— Ventilating Fan, Sirocco Type, 660*
— Winding. See *Winding*
— Work, Electric Battery Locomotive, 252*
— — Gate-End Switch, 180*
— Workers, Health of, 294
— Workings, Belt Conveyors for, 226*
— See also *Mines* and *Coal*
Collinson, G. R., on Jet Dispersers for Water Discharge, 247*
Collisions. See *Accidents*
Colloids, Chemistry of, British Association Papers, 480
Colombia, Economic Conditions, Report, 681
Colombo Electric Supply, Hydro-Electric Scheme, 473*
— Harbour, Future Depth Requirements, 457
Coloured Signals, Street Traffic Regulation, 24
Colville, D., and Sons, Ltd., Metallurgical Exhibits, British Empire Exhibition, 100
Combined Stress. See under *Tests* (*Materials*)
Combing Machine, Cotton, Nasmith, 90*
Combustion of Fuel, Heat Losses in, 40*
— See also *Fuel; Gaseous Explosions*
Commerce. See *Trade.* See also *Industries and Commerce* in PARAGRAPH INDEX
Commercial Aviation. See *Aeronautics.*
— Motor Cars. See *Motor*
Commissioner System, Conduct of Public Services, 375
Committee, Engineering Standards. See *Engineering* and *Standardisation*
— Heat Engines and Boiler Trials, Progress of Work, 55. See LETTERS, 101. See also 818*, 835, 866*
Commonwealth. See *Australia*
Commutator Insulation, Undercutting Tool 621*
Companies. See PARAGRAPH INDEX
Comparator, Gear Tooth, Sykes, 822*
Comparison Standards, Thermal Efficiency of Steam Engines, 818*, 835, 866*
Compensation, Workmen's. See *Labour*
Complex Stresses, Report of B.A. Committee, 286. See 506
Compound Locomotives. See *Locomotives*
— Stress. See *Tests* (*Materials*)
Compressed Air, Colliery-Haulage Gear. See *Haulage Gear*
— — Consolidation of Concrete Piling, 414*
— — Flow Meters (G. Kent, Ltd.), 193*
— — Locomotives, Charging Compressor, 498*
— — Turbine and Generator, Electric Colliery Lamp, 530*
— — See also *Pneumatic*
— — Tools. See *Machine Tools*
— Gas Cylinders. See *Gas*
Compression of Steel Balls, Formula, 101
Compressor, Air. See *Air Compressor*
— Ammonia, Electrically-driven (Haslam Foundry and Engineering Co., Ltd.), 290*

Compressor, Ammonia, High-Speed, Refrigerating Plant, 561*, 594*
— Carbon Dioxide, High-Speed Refrigerating Plant, 559*
Conciliation in Labour Disputes. See *Labour* and PARAGRAPH INDEX
Concrete Construction, Gladstone Dock, Liverpool, 48*
— Construction, Swedish Arch Dams, 76
— Effect of Salt on, 618
— Expansion of, Work of National Physical Laboratory, 101
— Foundation Blocks, Eccentrically-loaded, Stress Distribution, 763*
— Piling, Air Pressure Consolidation, 414*
— Reinforced. See *Ferro-Concrete*
— Waters, for Mixing, Investigations, 618
— See also *Ferro-Concrete* and PARAGRAPH INDEX
Condensate Pump, Turbine Driven, S.S. "Drottningholm," 841*
Condensation Pump, Mercury-Vapour, High Vacua, 267*
Condensers, Air Pumps for. See *Pumps, Air*
— Tube Corrosion, Research, 335
— — Corrosion in Sea Water, 378
— See also *Electric*
Condensing Plant, Centrifugal Pump for Circulating Water, 5*
— — Centrifugal Pump for Condensate, 5*
— — Ferro-Concrete Cooling Towers, 776
— — Geared Turbines, S.S. "Drottningholm," 841*
— — Manchester Power Station, Tests, 668
Conductivity, Heat-Insulating Materials, Cold Stores, Tests, 742*
— — Measurement, National Physical Laboratory, 279*
— — Spongy Rubber, 682
— See also *Electric*
Conduit, Electric Wiring, Bending Tool, 236
Conference, Life-Boat, International, 16. See *Erratum*, 207
— World Power. See *World Power Conference*
Congella Dock, Durban, Electric Crane, 104*. See 238
Congress, Empire Mining and Metallurgical, R. Nelson on Electricity in Mines, 243
— Institute of Transport, British Empire Exhibition, 450
— International Mathematical, Toronto: Hon. Sir C. A. Parsons on the Steam Turbine, 469; Prof. Sir J. B. Henderson on Teaching Mathematics, 491
Connecting Rod Bolt, Composite Material, Fracture of, 418
— — Motor Car Engines, Light Alloys, 455
Conservation of Coal. See *Coal; Fuel; Pulverised Coal*
Constant Current, Electric Distribution, Austin System, 734*
Constantinesco Variable Transmission Gear, 87
Constructional Engineering Co., Ltd., Railway Transport of Large Cupolas, 592*
Contrafio Air Pumps, (Vickers Ltd.), 573*
Controliers, Electric Motor. See *Motors, Electric*
Conveyor, Automatic, Coal Handling (E. Bennis & Co., Ltd.), 766
— Belt, for Coke, the Robins, 512*
— Coal, for Colliery Workings, 226*
— Gate End, Loading Colliery Tubs, 227*
— Renold Hollow-Stud Steel Chain for, 260*
— Unloading, for Cargo Steamers, Great Lakes, 723*. See *Erratum*, 863
Cook, T., & Son, Ltd., Nile Steamers, 463*
Cooke, Troughton & Simms, Ltd., Ozalid Photo-Printing Process, 660
Cooking Apparatus, Electric, London & North Eastern Railway Kitchen Car, 480*
Cooling Systems, Water, Flow Indicator, 548
— Towers, Ferro-Concrete, 776
Co-operation in Indian Agriculture, 509. See 537
Co-ordination of Industrial Research, Records Bureau, 586
Copenhagen Harbour, Proposed Bridge, 292
Copper Alloys. See *Brass; Bronze; Gunmetal*; and *Alloys* under *Metallurgy*
— Cakes for Rolling, Specification, 686
— Conductors, Specification, 738. See 425
— Effect of Cold Rolling on Hardness, 386*, 408
— Effect of Iron, 379
— Electro-Deposited, Hardness of, 599
— Ore Deposits, Outokumper, Finland, 501
— Prices. See *Metal-Price Diagrams*
— Products, British Empire Exhibition, 335
— Standard Specifications, 425, 686, 738
— See also *Metallurgy*
Core Drying Stoves, Gas and Coke Firing, 460
Corn, Artificial Drying in Ricks, 554*
Corona Vertical Drilling Machine, 316*
Corrosion, Aluminium, by Sea Water, Prevention, 335
— Condenser Tubes, Research, 335
— — Tubes, in Sea Water, 378
— Iron and Steel, in Sea Water, 775
— of Metals, Prevention, Metal-Spraying Process, 409
— Research, Institute of Metals, Report, 378
Corse, W. M., on Non-Ferrous Metallurgy in America, 376
Costs, Labour, Apportionment, 582. See 433
— Manufacturing, Reduction of, 419
Cotton Industry of India, 536
— Mills, Air-Humidifying Apparatus, Andrew System, 873*
— Preparing, Spinning and Weaving Machinery, British Empire Exhibition, 11*, 89*, 247*
Countershafts, Pollard Drilling Machines, 316*
Coupling, Automatic, Willison Central-Buffer Type, 478
— Shaft, Power Absorption under Water, 418
— See also *Clutch*
Coventry Centreless Grinding Machine, 404*
Coverings, Non-Conducting. See *Heat Insulation*
Cowper-Coles, S., on Sherardising Process, 277*; on Testing Galvanised Iron, 825*
Cox & Danks, Ltd., Salvage of German Fleet, 233*. See 373
Cracking, Oil, Recent Developments, 523
Crammond, E., on the Economic Position of Great Britain, 617
Crane, Derrick Car, Bridge Erection, 758*
— Electric, 25-Ton Level-Luffing, for Durban, 104*, See 238
— Equipment, Gladstone Dock, Liverpool, 48*
— — Turbine Shops, Brush Co., 699*
— Hooks, Stresses in, United States Investigations, 491
— Overhead, Electric, 1½-Ton, with Underslung Bridge, 164*
— Wire Ropes for, Research, 856*, 867
— See also *Hoists*
Crankshafts, Estimation of Stresses, 418
Crawford Avenue Power Station, 50,000-kw. Turbo Generator, 66*. See 45
Cray Reservoir, Swansea Waterworks, Jet Dispersers for Water Discharge, 247*
Creepers, Colliery Tubs, Coal-Screening Plant, 338*
Creeping, Steel, Tensile Tests, 793, 816*, 843*
Crighton, R., The Late, 327
Crighton Opening Machine for Cotton, 13*
Critical Points, Metals. See *Metallurgy*
— Potentials in Radiation, 322
Crompton, Col. R. E., on Mechanical Transport on Roads, 681
Crops, Drying by Hot Air, 554*
Cross Oil Cracking Process, 524
Crossley & Co., Milling Machine, 353*; Radial Drill, 359*
Crozier System, Shale Oil Distillation, 538*
Crude-Oil Engines. See *Engines, Oil*
Cruisers. See *Warships*
Crystals, Metallic, Surface Phenomena, 368
— Natural History of (Review), 631
— Structure, Analysis by X-Rays, 349*, 368, 428
— — and Refractive Index, 368
— — Solid Argon, 368
Crystalline Structure of Metals. See *Metallography; Micro-Photographs*
Crystallisation, Salts and Sugar, from Solutions, 738
"Cubore," M.S., Trials and Working Results, 714
Cultivating Machine for Grass, 807
Culvert, Brickwork, Damage by Molluscs, 775
Cunard Liner "Aurania," 380
— — "Mauretania," Record Atlantic Voyages, 424; Repairs to Turbines, 424*
Cupolas, Railway Transport of, 592*
Cupro-Nickel, Tensile Strength, Temperature and Cold Work, Relationship, 408
Current, Electric. See *Electric*
Cutlers' Feast, Sheffield, J. H. Thomas on Class Warfare, 681. See LETTER 746
Cutlery Grinding, Accidents in, 773
Cutting Machines, Coal. See *Coal Cutting*
— Machine, Oxygen-Jet, Godfrey, 124*
— -off Machine. See *Machine Tools*
— Properties, Tool Steel, Testing Machine, 446*
Cycle and Motor Cycle Show, Olympia, 652*
— Motor. See *Motor Cycle*
Cylinders, Engine, Determination of Clearance Volume, 101*
— Gas. See *Gas*
Cylindrical Grinding Machine. See *Grinding Machine* under *Machine Tools*
Czecho-Slovakia, Power Resources, 32. See 19

D.

DAGENHAM, Proposed Works, Ford Motor Co., 91
Dahl, H. O., on Water Turbine Design, 63
Dairy Industry, New Zealand, 289*
Dallyn, F. A., on the Engineer and Public Health, 286
Dalmarnock Gas Works, Low-Temperature Carbonisation Plant, 491, 682
"Damietta," Nile Tourist Steamer, 463*
Dams, Arch, Recent Swedish Designs, 76
— Construction, Newfoundland Water Power Plant, 125*
— — in Italy, 44
— Earthen, Rock Fill and Masonry, Construction in United States, 466
— Multiple Arch, River Tirso, Sardinia, 632*
— Steel Sheet Piling, Gladstone Dock Construction, 48*
— Waldeck Reservoir, Temperature Fluctuations, 425
Danish Cable-Laying Steamer "Edouard Suenson," 196*, 269*
— Expedition, Survey of North West Greenland, 344
— See also *Denmark*
Danube, River, Water Leakage from, 580
Darrer, R., Electric Iron Smelting in Switzerland, 637
David, Prof. W. T., on Missing Pressure in Gas Engines, 605, 623*, 679, 684. See LETTERS, 641, 704, 746; on Heat Loss in Gas Engines, 605, 629*, 679, 684. See LETTERS, 641, 704, 746
Davidson & Co., Ltd., Ventilating Fan, British Empire Exhibition Colliery, 160*
Davidson, F., & Co., Microscopes for Metallography, 514*
Davies, C. E., on Roll Bearings, 569*, 601*, 636*. See LETTER, 769*
Davis, A. P., on the Construction of Dams, 466
Dawes Plan, German Reparations, and British Engineering Industry, 695, 725, 757
De Beers Mines, Diamond Washing Plant, 205*
De Feo, Capt., on Submarine Design, 232
De Laval. See *Laval* and *Turbine*
De Roll, L., Carriages, Penang Hills Railway, 728*
Dean, Smith & Grace (1908), Ltd., Lathes, 401*
Dean System, Electrical Operation of Valves, 671*
Decentralisation, Industrial, and Electric Power Supply, 185
Deer Lake Hydro-Electric Power Station, Newfoundland, 125*
Deflection of Circular Plates, 286
Degrees, Engineering, London University, 831
Delfos, Ltd., Rock Drills, 174*
Dellner, G., on Swedish Oil Engines, 105. See 83
Delta Metal Co., Ltd., Exhibits at British Empire Exhibition, 335
Denmark, Bridge Construction Projects, 292
— Electric Power in Agriculture, 84
— Electrical Power from Norway, 78, 114, 213
— Power Resources, 32. See 19
— See also *Danish*
Dennis Brothers, Ltd., Motor Fire Engine, 383*; Trailer Fire Pump, 426*
Derrick Car, Bridge Erection Work, 758*
— See also *Cranes*
Destroyers. See *Warships*
Detonation, Internal-Combustion Engines, 616
Dew Point Hygrometers, National Physical Laboratory, 278*
Diagrams, Indicator. See *Indicator*.
— Metal-Price. See *Metal-Price Diagrams*
— Temperature-Entropy, Carville and North Tees Power Stations, 58*
— — Entropy, Modified Form, 215*
Dial Gauge, Gear-Tooth Measurement, 821*
Diamond Coal Cutter Co., Ltd., Coal-Cutting Machine, 225*; Shaking Conveyor for Colliery Workings, 227*
— Washing Plant, De Beers Mines, 205*
Diesel Engine Users' Association, F. H. Smith on Exhaust Temperatures, Diesel Engines, 544.* Report on Working Costs, Diesel Engines, 715
— — See *Engines, Oil, Diesel; Marine Propulsion*
Diffraction, Optical, Theory of, 548
Digging Machine. See *Excavating Machine*
Dimensional Notation, Vector Quantities, 686
— Problem, Notched-Bar Impact Tests, 286
Dining Cars, Electrically-Equipped Kitchen Car, London & North Eastern Railway, 480*
Direction Finding. See *Telegraphy, Wireless*
Directories. See LITERATURE INDEX
Discs, Rotating, Conical Profile, Stresses in, 418. See LETTER, 486
Disease, Prevention by Medical Science, 265
Displacement and Draught of Ships, Formula Connecting, 26
Disputes, Trade. See *Labour*
Dissociation in Gaseous Explosions, 605, 623*, 629*, 679, 684. See LETTERS, 641, 704, 746
Distillation, Tar, Report on Alkali Works, 128
Distilling Plant, Shale Oil, Crozier System, 538*
Dividing Head for Milling Machine (J. Parkinson & Son), 355*
Diving Dress, Self-Contained, 149*
Dixon, Prof. S. M., Tests of Quick-Hardening Cement, 867
Docks, British, Report, 715
— Construction, Schemes in Parliament, 777
— Dry, at Esquimalt, B. C., 449*
— Durban, South Africa, British Empire Exhibition, 173; Electric Crane, 104*. See 238
— Facilities and Coastal Shipping, 774
— Floating, Submarine Testing, Use for Salvage Operations, 233*. See 373
— — (Swan, Hunter & Wigham Richardson, Ltd.), 460
— Gladstone Liverpool, Construction, 47*
— London, Roads Improvements, 572*
— — Trade Statistics and New Works, 554
— Montreal, Electric Locomotives for, 746
Dockyard Apprentices and the Whitworth Scholarships, 741. See LETTERS, 746, 770, 810, 831, 861
— Chatham, Automatic Telephone Exchange, 373
Domestic Uses, Electric Power, 84
Donaldson Line, M.S. "Moveria," Launch, 548
Doors, Tenoning Machine for, 298*
Doppelgas Process, Gas Manufacture, 37
Dorman & Co., Ltd., Motor-Car Engines and Gear-Box, 577*
Dorman, Long & Co., Ltd., Designs for Sydney Harbour Bridge, 129*. See 169, 198*; Exhibit, British Empire Exhibition, 439
Double-Helical Gears. See *Gears*
— Reduction Gears. See *Marine Propulsion*
Doubling Frame for Cotton Yarn, 91*
Douglas & Grant, Ltd., Rice Machinery, 538*
D.P. Battery Company, Accumulators, Passenger Cars, British Empire Exhibition, 198
Draft Tubes, Hydraulic Turbine, Design, 153*
Draught and Displacement of Ships, Formula Connecting, 26
— of Merchant Shipping, Deepening of Colombo Harbour, 457
Draughtsman, Locomotive, Salary and Status, 765
Draw-Out Truck Switchgear. See *Switchgear*
Drawgear, Mallet Simple Locomotive, 861*. See 795*
Drawing Frame for Cotton, 90*
Dredgers, Suction, Sea-going, Hopper Type, Diesel-Electric Drive, 713
— — Sea-going Hopper Type, United States Engineer Department, 713
Dredging, New York Harbour Approaches, 713
— Work, Basis for Payment, 437. See *Erratum*, 486
— — Floating Pipe Lines for Sludge Pumping, 438. See *Erratum*, 486
— — Retaining Walls for Reclaimed Land, 438. See *Erratum*, 486
— — River St. Lawrence, 438. See *Erratum*, 486
— — Sludge Disposal, 437. See *Erratum*, 486
Dresler Process, Pipe Manufacture, Blast-Furnace Slag, 600
Drier, Air, for Transformer Vents, 802*
Drills and Drilling Machines. See *Machine Tools*
— Rock, Climax Percussion Type, 528*
— — Delfos, Ltd., 174*
Driving Chains. See *Chains*
Drops, Cloud, Formula for Diameters, 592
— Forging Hammers. See *Hammers* under *Machine Tools*
— Forgings (Vickers, Ltd.), 100
— Stamps for Multiple-Impression Dies, 705*
— Tests. See *Tests (Materials)*
"Drottningholm," S.S., Geared-Turbine Machinery, 841*
Drummond Brothers, Ltd., Small Lathes, 67*, 310*, 447; Milling Machine, 356
Dry Dock. See *Dock*
Drying Crops by Hot Air, 554*
— Machine for Coffee Berries, 542*
— Stoves, Foundry Work, Gas and Coke Firing, 460
— Timber, Experimental Investigations, 775
— Towers for Waste Wood, 39, 503
Drysdale & Co., Ltd., Pumping Machinery, British Empire Exhibition, 217*
Du Bosque, F. L., on Diesel-Electric Ship Propulsion, 714
Dubbs' Oil-Cracking Process, 524
Ducol High-Tensile Steel, 100
Duncan, R., the late, 800
Dunfermline Water-Supply, Self-Closing Valve, 143*
Dunford & Elliott (Sheffield), Ltd., Motor-Cycle Fire Extinguisher, 653
Dunlap, J. H., the Late, 229
Dunstan, Dr. A. E., on Oil Cracking, 523
Duralumin Exhibits, British Empire Exhibition, 335
Durban, Electric Crane for Congella Dock, 104*. See 238
— Port of, British Empire Exhibition, 173
Durham, Road Reconstruction in, 24
Dust, Coal. See *Pulverised Coal*
— Electrical Precipitation, 648. See LETTER, 676
— Stone, Colliery Use, Materials for, 675; Dusting Machine, 808
Dutch East Indies, Railway Electrification, 118
— — Indies, Report on Trade, 832
— — Indies, Industrial Standardisation, 121
— — Indies, Power Resources, 33. See 19, 44
— — Indies, Water-Power Development, 44
— Merchant Ships, Propelling Machinery, 119
— System, Steel Tubular Construction, 674*. See 716
D'Yrsan Light Motor-Car, 653
Dynamics of Flying. See *Aeronautics*
Dynamometer Cars, Electrical Recording Instruments, 208*
— See also *Torsion Meter*
Dynamos. See *Generators, Electric; Turbo-Generators; Turbo-Alternators*

E.

EARL OF DUDLEY'S Round Oak Works, Ltd., Exhibit at British Empire Exhibition, 100
Earth-Boring Scheme, Sir C. A. Parsons', 548
— Gravitational Field, Local Variations Report on, 410
— Magnetism. See *Magnetism*
— Pressure, Eccentrically-Loaded Foundation Blocks, 763*
— Stresses Due to Loaded Surface, 1*, 156*
Earthen Dams, United States, 466
Earthquake Investigations, Report on, 410
— Recorders, Milne-Shaw, Correlation of Records, 410
— See also *Seismograph*.
Eaton, Major B. J., on Research Work on Rubber Plantations, 848
Eccles, Dr. W. H., on Amateur Wireless Transmission, 457
Ecole Polytechnique, Recruitment of French Naval Officers, 554
Economics, Coal-Mining Industry, 518*, 521
— Industrial, French Position, 332
— — Reduction of Manufacturing Costs, 419
— — See also *Labour*
— Position of Great Britain, 617
— Railway. See *Railway*
— of World Power, 35
Economy, Fuel. See *Fuel Economy*
Eddington, Prof. A. S., on Relativity, 535
Edgware Extension, London Underground Railways, Automatic Substation, 227*; Opening, 260
Edmonton, Canada, Water and Natural Gas Supply, 539
"Edouard Suenson," Danish Cable-Laying Steamer, 196*, 269*

Education:

Apprentices, Engineering, Training, 122
Broadcasting, Educational Value, 122
Chemical Engineering Laboratory, University College, London, Opening, 682
City and Guilds Engineering College, Tests of Quick-Hardening Cement, 867
Colleges, Technical, Need for Training Teachers, 135. See LETTER, 166
Degrees in Engineering, London University, 831
Ecole Polytechnique, Recruitment of French Naval Officers from, 554
Education of Engineers, 122
— in India, 509
Engineering Degrees, London University, 831
— Education, Holland and Sweden, 122
— Scholarships, Norton & Gregory, 685
— Students, Teaching Mathematics, 491
— Teachers, Need for Training, 135. See LETTER, 166
Esthonia, Technical and Commercial Education, 122
Evening Classes, London County Council, 377
Industrial Concerns, German, Co-operation with Technical Schools, 122
Leeds University, Jubilee Celebration, 839
London County Council Evening Classes, 377
— University Degrees in Engineering, 831
Mathematics, Teaching to Engineering Students, 491
Norton & Gregory Engineering Scholarships, 685
Rensselaer Polytechnic Institute, Centenary Celebrations, 618
Scholarships, Engineering, Norton & Gregory, 685
— Whitworth, and Dockyard Apprentices, 741. See LETTERS, 746, 770, 810, 831, 861
— Whitworth, Regulations, 233
Science Teaching in Technical Schools, 865

Education—*continued.*

Teachers, Engineering, Need for Training, 135. See LETTER, 166
Teaching Mathematics, Engineering Students, 491
Technical Colleges, Need for Training Teachers, 135. See LETTER, 166
— — Rensselaer Polytechnic Institute, Centenary Celebrations, 618
— Schools, Science Teaching in, 865
Training of Engineering Apprentices, 122
University College, London, Chemical Engineering Laboratory, 682
— of Leeds, Jubilee Celebration, 839
— of London Degrees in Engineering, 831
Whitworth Scholarships, Regulations, 233
— — and Dockyard Apprentices, 741. See LETTERS, 746, 770, 810, 831, 861
See also PARAGRAPH INDEX
Edwards, Prof. C. A., on Pickling of Steel and Hydrogen Diffusion, 365
Efficiency of Boiler Plants. See *Boiler Plants*
— Marine Oil Engines, Report, 730, 750*, 784*, 798
— Thermal, Electric Power Stations, 377
— — 15,000-kw., Turbo Generator, 704
— — Steam Engines, Comparison Standards, 818*, 835, 866*
— — of Steam Turbines, 469, 704
Egbert, Capt. E. F., on Cavitation in United States Warships, 717*. See LETTER, 769
Egyptian Government, Oil-Engined Tugs, 517*
— Industries, State Assistance, 586
— State Railways, Royal Saloon Coach, 475*
— Towns, Water Supply, Purification and Chlorination Plant, 735
Einstein's Theory of Relativity, 535
Ejectors, Air, Condensing Plant, S.S. "Drottningholm," 841*
Elastic Limit, Tensile, Influence on Fatigue Breakdown, 793, 813*

Electric:

Accumulator Charging Plant, Electric Road Vehicles, 719
— Factories, Lead Poisoning, Home Office Regulations, 753
— Locomotive, Colliery Haulage, 252*
— Nickel-Iron, Road Traction, 719
— Passenger Cars, British Empire Exhibition, 198
— Road Vehicles, Characteristics and Uses, 688*, 719
— Vehicles. See also *Motor Vehicles*
Agriculture, Use of Electricity, 84, 116, 382
Alternating Currents, High-Tension, Rectifying Valves for, 492*
— — Rectifiers, Mercury-Vapour Automatic and Semi-Automatic Substations, 782*, 845*
— — Rectifier, the Transverter, 14, 81
— — Wave Form, Harmonic Analysing Instruments, 651, 876*
Alternator. See *Generator* and *Turbo*
Arc Furnace. See *Furnace, Electric*
— Welding. See *Welding*
Austin Constant-Current System, Ships' Auxiliary Machinery, 734*
Automatic Substations. See *Substations*
Auto-Transformer Starter, Induction Motors, 107*
Battery Vehicles See *Motor Vehicles*
— See *Accumulator* (above)
Boilers, Electrically-Heated, 127, 449
Buildings, Electrical Equipment Regulations, 202
Cables, High-Tension Power Transmission, 80. See LETTER, 142. See *Erratum*, 198
— Research, National Physical Laboratory, 100
— Telegraph, Continuous Loading, New York-Azores, 461
— Works, Henley's, Research Laboratories, 736*
Capstan, Electric (Vickers Ltd.), 502*
Central Stations. See *Power Stations*
Charcoal, Conductivity of, Electric Iron Smelting, 637
Circuit Breaker. See *Switchgear*
Coke, Conductivity of, Electric Iron Smelting, 637
Collieries, Electric Shock Fatalities, 243
— Safe Use of Electricity, 243. See 808
Commutator Insulation, Undercutting Tool, 621*
Condensers, Dielectric Properties of Mica 828
— Synchronous Motors as, 109
Conductivity, Coke and Charcoal, Electric Iron Smelting, 637
Conduit, Electric Wiring, Bending Tool, 236
Constant-Current, Electric Distribution, Austin System, 734*
Cooking Apparatus, London & North Eastern Railway Kitchen Car, 480
Copper Conductors, Standard Specification, 738
Cranes. See *Cranes*
Dielectric Properties of Mica, 828
Domestic Uses, Electric Power, 84
Dynamo. See *Generator; Turbo-Generator; Turbo-Alternator*
Electric Supply Industry, Development, 617
Electrical Standards, International, Work of National Physical Laboratory, 6
— Engineering, Unsolved Problems, 56
— — 100 Years' Progress, 193. See 266
— Machinery Breakdowns, Report, 418
— Work, National Physical Laboratory, Report on, 6, 100
Electricity Commissioners, Electricity Supply, London District, 171; Report on Power Generation, 377; West Midlands District, 745
— Supply Regulations, Various Countries, 37
Electro-Chemical Industry, Austrian, 116
— — Industries, Canadian, 448
— — Industries, Electric Power in, 116
Electrolytic Iron Manufacture, 117

Electric—*continued.*

Electro-Metallurgical Industries and Canadian Water Power, 449
Electro-Metallurgy, Italy, Sweden and United States, 117
Electroplating. See *Electro*
Electrotechnical Commission, International, Work, 121
Electro-Thermal Industries, Electric Power in, 116
Furnaces. See *Furnaces*
Generating Stations. See *Power Stations*
Generator. See *Generator* and *Turbo*
Hydro-Electric Power Plants. See *Power Plants*
Ignition for Internal-Combustion Engines. See *Ignition; Magneto*
Ilgner System, Electric Drive, Sheet Rolling Mills, 842*
Impregnating Plant, Experimental, Henley's Cable Works, 737*
Induction Motors. See *Motors, Electric*
— Regulators (Switchgear and Cowans, Ltd.), 181*
Industrial Uses of Electric Power, 85
Instruments, Electrical Measuring, Commercial and Indicating (Review), 337
Insulating Oils, De Laval-Watson Testing Apparatus, 877*
Insulation, Commutator, Undercutting Tool, 621*
— Failures, Electrical Machinery, 418
International Electrical Standards, Work of National Physical Laboratory, 6
Kitchen Car, Electrically-Equipped, London and North Eastern Railway, 480*
Laboratory, High-Tension Electric, National physical Laboratory, 6; Henley's Telegraph Works Co., Ltd., 736*
Lamps, Electric, Progress with, 77
— — with Turbine-Driven Generator, Colliery Use, 530*
— Incandescent, Possible Developments, 56
— Mercury Vapour, Kinematography, 295*
— Safety, for Miners, Caeg, 529
Lighting, Electric, Colliery Fittings, 529*
Locomotives. See *Locomotives, Electric*
Machines. See *Generators; Motors; Turbo*
Magnetos. See *Magnetos; Ignition*
Mains. See *Cables* (above).
Mercury Vapour Lamp, Kinematography, 295*
— — Rectifier Substations, 782*, 845*
Mica, Dielectric Properties, 828
Motors. See *Motors, Electric*
Oil, Insulating, De Laval-Watson Testing Apparatus, 877*
— Switch. See *Switchgear*
Planing Machines, Electric Drive (Lancashire Dynamo and Motor Co., Ltd.), 362*; Stirk Spilt-Field System, 362*; T. Shanks and Co., Ltd., 363
Power-Factor Meter, Recording, 207*
— Stations. See *Power Stations*
— See *Power*
Precipitation, Electrical, Dust and Fog, 648. See LETTER, 676
Pyrometer. See *Pyrometer*
Railways. See *Railways*
Rectifier, Alternating Current, the Transverter, 14, 81
— Mercury-Vapour, Automatic and Semi-Automatic Substations, 782*, 845*
— Valves, High-Tension Currents, 492*
Regulations, Electrical Equipment of Buildings, 202
Resistance of Coke and Charcoal, Electric Iron Smelting, 637
— Materials, Standard Specification, 651
— Welding. See *Welding*
Rivet Heater (A.1 Electric Welding Appliances Co.), 828*
Road Vehicles, Electric. See *Motor Vehicles*
Rolling Mills, Electric Driving of. See *Rolling Mills*
Röntgen Rays. See *Röntgen*
Rotary Converters, Automatic Starting and Control Gear, 13*, 227*
Screens, Electrically Heated, Ice Prevention, Water Power Plants, 74
Ship Propulsion. See *Marine Propulsion*
Signalling Apparatus in Mines, Gas Ignition by, 243
Single Phase. See *Generators; Motors; Power; Locomotives; Railways*
Sounds, Vowel, Electric Production, 828
Speed Recorder, Electrical, Magneto Generator for, 208*
Standards, Electrical, International, Work of National Physical Laboratory, 6
Starters, Motor. See *Motors, Electric*
Steel Manufacture. See *Metallurgy* and *Furnace, Electric*
Storage Battery. See *Accumulator* (above)
Street Railways. See *Tramways*
Substation. See *Substation*
Switchgear. See *Switchgear; Motors, Electric*
Synchroniser, Rotary, Switchboard (Erskine, Heap & Co., Ltd.), 107
Telegraphy. See *Telegraphy*
Telephony. See *Telephony*
Thermometer. See *Thermometer*
Three-Phase, See *Generators; Motors; Power; Locomotives; Railways*
Traction. See *Locomotives, Electric; Railways; Railways; Tramways*
Tramways. See *Tramways*
Transformers. See *Transformers*
Transverter, High-Tension Direct-Current Power Transmission, 14, 81
Turbo-Generators. See *Turbo-Generators*
Valves, Electrical Operating Gear, Dean System, 671*
— Thermionic. See *Valves, Thermionic; Telegraphy, Wireless; Telephony, Wireless*
Voltage Regulation, Power Supply, 78
Wave Form, Alternating Currents, Harmonic Analysers, 516, 876*
Welding. See *Welding*
Wind-Driven Generators, Use in Agriculture, 382

Electric—*continued.*

Wind-Driven Electric Lighting Plants, Airolite, 60
Winding Gear. See *Winding*
Wireless Telegraphy. See *Telegraphy*
— Telephony. See *Telephony*
Wiring, Electric, of Buildings, Regulations, 202
X-Rays. See *Röntgen Rays*
See also PARAGRAPH INDEX
Electrical Apparatus Co., Ltd., Motor Starting and Control, Panels, 447
— Engineering, 100 Years' Progress, 193. See 266
— — Unsolved Problems, 56

Electrical Engineers, Institution of:

Kelvin Centenary, 97. See 104
Regulations for the Electrical Equipment of Buildings, 202
Presidential Address by W. B. Woodhouse, on Electricity Supply, 617
Electric Harmonic Analyser by J. D. Cockcroft, J. A. Tyacke and Prof. M. Walker, 651. See 876*
Automatic and Semi-Automatic Mercury-Vapour Rectifier Substations by G. Rogers, 782*, 845*
Electrical Machinery Breakdowns, Report, 418
— Standards, International, Work of National Physical Laboratory, 6
— Work, National Physical Laboratory, Report on, 6, 100
Electricars Electric Vehicles, 689*. See 719
Electricity Commissioners. See under *Electric*
Electro-Chemical Industry, Austrian, 116; Canadian, 448
— — Industries, Electric Power in, 116
Electro-Deposited Metals, Hardness of, 599
Electrolytic Corrosion. See *Corrosion*
Iron Manufacture, 117
— Nickel Processes, 448
Electro-Metallurgical Industries and Canadian Water Power, 449
Electro-Metallurgy, Italy, Sweden and United States, 117
Electromobile Electric Vehicles, 689*. See 719
Electrons, Mercury Atoms, Orbital Transfers, 367
— Removal from Atoms of Metals, 322
Electro-Plating and Electro-Forming, Treatise on (Review), 590
Electrotechnical Commission, International, 121
Electro-Thermal Industries, Electric Power, 116
Elements, Ionised, Spectra of, 321*
— Rare, Chemistry of (Review), 336
Elevator for Colliery Tubs, Coal-Screening Plant, 338*
— Renold Hollow-Stud Steel Chain for, 260*
Ellis, Sir W., on Iron and Steel Industry, 365
Ellison, G., Colliery Switchgear, 50*
Emergency Bilge Pump, Gwynnes Invincible, 2*; Drysdale's, 217*
Emery Wheels. See *Grinding* under *Machine Tools*
Empire, British. See *British Empire*
— Exhibition. See *British Empire Exhibition*
— Mining and Metallurgical Congress, R. Nelson on Electricity in Coal Mines, 243; Dr. W. Rosenhain on Light Alloys, 455
— Motor Fuels Committee, Report, 616
Employees. See *Labour*
Employers' Liability. See *Labour*
Employment. See *Labour*
End Gauges, Comparison with Line Standard, 128*
— — Electrical Method of Hardening, 128*
— — Sensitive-Level Comparator, 129*
Endurance Tests. See *Alternating Stress* under *Tests (Materials)*
Engines, Aero. See *Aeronautics*
— Diesel. See *Engines, Oil, Diesel; Marine Propulsion; Motor Ships*
— Fire. See *Fire Engines*
— Gas, 1,650-h.p. Blowing, Working Results (Galloways, Ltd.), 830*
— — Development in Sweden, 83. See 105
— — Evolution of, 83
— — Large Power, in Germany, 105*. See 83
— — Missing Pressure and Heat Loss, 605, 623*, 629*, 679, 684. See LETTERS, 641, 704, 746
— — Modified Temperature-Entropy Diagram, 215*
— — 150-h.p. 4-Cylinder Vertical (Brownett, Lindley & Co., Ltd.), 847*
— — and Oil, Report on Breakdowns, 418. See 548
— — and Oil, Thermal Efficiency, Electric Power Production, 377
— — See also *Gaseous Explosions; Producer* and PARAGRAPH INDEX
— Hauling, Electric, Penang Hills Railway, 789*, 852*
— Heat, Thermal Efficiency, Standards of Comparison, 818*, 835, 866*
— Hydraulic, Swash-Plate Type, Armstrong Variable Speed Gear, 187*
— Indicators. See *Indicators*
— Internal-Combustion, Alcohol as Fuel, 616
— — Combustion, Character of Fuels, 616
— — Combustion, Determination of Clearance Volume, 101*
— — Combustion, Detonation in, 616
— — Combustion, Development in Sweden, 83, 105
— — Combustion, Flow Indicator for Cooling Systems, 548
— — Combustion, Indicator Connections, 424
— — Combustion, Influence of Fuels on Performance, 616
— — Combustion, Missing Pressure and Heat Loss, 605, 623*, 629*, 679, 684. See LETTERS, 641, 704, 746
— — Combustion, Modified Temperature-Entropy Diagram, 215*
— — Combustion, Recent Research, 551
— — Combustion, Synchro-Balance System, Blackstone's, 593*. See 22
— — Combustion, Standardisation of Magnetos, 142
— — Combustion, Transport Work, United States, 117

Engines, Internal Combustion. See also *Turbines, Gas*
— Locomotive. See *Locomotive*
— Motor Car. See *Engines, Petrol*
— Oil, Agricultural Show, Leicester, 21*, 60*
— — Canadian Exhibits, British Empire Exhibition, 140
— — for Grain Elevator Drive (Vickers-Petters, Ltd.), 643*
— — and Gas, Report on Breakdowns, 418. See 548
— — and Gas, Thermal Efficiency, Electric Power Production, 377
— — 300-h.p., Horizontal Cold-Starting, Spring-Injection System (Blackstone & Co., Ltd.), 60*, 638*. See 21
— — 300-h.p., 6-Cylinder, Ingersoll Rand, Shunting Locomotive, 781*
— — Diesel, Carels, Improvements in, 544*
— — Diesel, German Developments, 110*, See 83
— — Diesel, Marine Auxiliary Machinery, 121
— — Diesel, Marine, Beardmore-Tosi, 83; Trials of M.S. "Silurian," 643; Trials of M.S. "Sycamore," 730, 750*, 784*, 798
— — Diesel, Marine, Bearing Pressures, 28*
— — Diesel, Marine, Development, 25, 119, 120, 148, 265, 656, 668
— — Diesel, Marine, Double-Acting, North-Eastern Werkspoor, 26*
— — Diesel, Marine, Double-Acting, Test Valve for Piston Leakage, 29*
— — Diesel, Marine, Duplex Pump for Piston Cooling, 5*
— — Diesel, Marine, with Electric Transmission, 120, 713, 714
— — Diesel, Marine, Exhaust Temperatures and Composition, 730, 751*. See 799
— — Diesel, Marine, Fuel Injection, Arschaouloff System, 29*
— — Diesel, Marine, Fuel Oil for, 836
— — Diesel, Marine, with Hydraulic Clutches and Reduction Gearing, M.S. "Vulcan," 92*, 369*
— — Diesel, Marine, M.S. "Cubore," Trials and Working Results, 714
— — Diesel, Marine, Palmer-Camellaird-Fullagar Type, Piston Withdrawal, 145*; Trials of M.S. "British Aviator," 236, 369
— — Diesel, Marine, Report on Trials, 730, 750*, 784*, 798
— — Diesel, Marine, Richardsons-Westgarth, Beardmore-Tosi, M.S. "Sycamore," Report on Trials, 730, 750*, 784*, 798
— — Diesel, Marine, Torque Measurements, 731. See 785
— — Diesel, Marine, Treatise on (Review), 336
— — Diesel, Marine, Two-Cycle, Double-Acting, Worthington, 482*
— — Diesel, Marine, Two-Stroke and Four-Stroke Cycles, 120
— — Diesel, Marine, Weights, 730, 750
— — Diesel, Working Costs, Electric Power Production, 715
— — Diesel, Running Speeds, 84
— — Diesel, Significance of Exhaust Temperature, 544*
— — Diesel. See also *Motor Ships; Marine Propulsion; Diesel Engine Users' Association*
— — Horizontal, Single-Cylinder (Fielding & Platt, Ltd.), 60*
— — Hot-Bulb and High-Compression, Development in Sweden, 105. See 83
— — Marine, 96-h.p. Four Cylinder, Hot-Bulb (Norris, Henty & Gardners, Ltd.), 595*
— — Marine, 450-h.p., Hot-Bulb Type (Vickers-Petters, Ltd.), 517*
— — Marine, 150-h.p. Thornycroft, Hospital Ship "Nabha," 421*
— — 18-h.p. Single Cylinder, Hot-Bulb Type (Norris, Henty & Gardners, Ltd.), 595*
— — at Smithfield Show, 807
— — Standard Specifications for Fuels, 692
— — and Steam Combined, the Still, Advantages, 84
— — and Steam, Marine, Comparisons, Tug Propulsion, 517
— — Synchro-Balance System, Blackstone's, 593*. See 22
— — Three-Cylinder 80-h.p., for Shunting Locomotive (Swiss Locomotive & Machine Works), 702*
— — Two-Speed Governor Gear (Vickers-Petters, Ltd.), 643*
— — Two-Stroke, 36-42-h.p., Hot-Bulb, Cartridge Cold Starter (Petters, Ltd.), 721*
— — Two-Stroke 5-h.p., Paraffin, Magneto Ignition (Petters, Ltd.), 720*
— — Treatise on (Review), 190
— — Vertical Cold Starting, and Dynamo (National Gas Engine Co., Ltd.) 21*
— — See also *Tractors* and PARAGRAPH INDEX
— Petrol, Aeroplane. See *Aeronautics*
— — and Air Compressor, Portable, The Broomaster, 179*
— — Canadian Exhibits, British Empire Exhibition, 140
— — and Centrifugal Pump, for Salvage Work (Dryadale & Co., Ltd.), 218*
— — Development in Sweden, 83. See 105
— — Marine, 10-h.p., Four-Cylinder (J. W. Brooke & Co., Ltd.), 815*
— — Marine, 375-h.p. Thornycroft, Coastal Motor Boat, 421*
— — Motor Car, 9-18-h.p., Four-Cylinder, Dorman, 577*
— — Motor Car, 10-25-h.p., Four-Cylinder, Dorman, 577*
— — Motor Car, Character of Fuels, 616
— — Motor Car, 60-70-h.p., Dennis Fire Engine, 383*
— — Motor Car, Design Tendencies, 553
— — Motor Car, Detonation in, 616
— — Motor Car, Development in Italy, 83
— — Motor Car, 15-9-h.p. Four-Cylinder, Bentley, 579*. See *Erratum*, 610.
— — Motor Car, 8-h.p., Four-Cylinder, Gwynne, 577*
— — Motor Car, Influence of Fuels on Performance, 616
— — Motor-Car, 20-h.p. Six-Cylinder, Rolls-Royce, 576*

Engines, Petrol, Motor Car, Standard Piston Rings, 175; Specification for Cast Iron Pots, 583
— — Motor Car, Use of Alcohol in, 616
— — Motor Car, Use of Light Alloys, 455
— — Motor Car, War-Office Subsidy Specification, 94, 136
— — Motor Car, 11-22 h.p. Wolseley, 574*
— — Motor Cycle, Olympia Exhibition, 653
— — Synchro-Balance System, Blackstone's, 593*. See 22
— — Transport Work, United States, 117
— — and Turbine Pump, Fire Appliance (Gwynne's Engineering Co., Ltd.), 147*
— — See also *Aeronautics; Carburettors; Motor Cars*
— Steam, and Air Compressor, Portable (Merryweather & Sons, Ltd.), 753*
— — Compound, High-Speed and Compressor (Browett, Lindley & Co., Ltd.), 690*
— — Compound, Vertical High-Speed, and 100-kw. Generator (Browett, Lindley & Co., Ltd.), 305*
— — Determination of Clearance Volume, 101*
— — Marine, Present Position, 668
— — Marine, Treatise on (Review), 336
— — Marine, Triple-Expansion, Cable Steamer "Edouard Suenson," 196*
— — Marine. See also *Marine Popuision; Turbines*
— — and Oil Combined, Still, Advantages, 84
— — and Oil, Marine, Comparisons, Tug Propulsion, 517
— — Portable (Sentinel Waggon Works, Ltd.), 21*, 807
— — Sentinel Type, Railway Motor Coach, 6*. See *Errata*, 133
— — Supply of Exhaust for Heating, 745
— — Thermal Efficiency, Standards of Comparison, 818*, 835, 866* See 55, 101
— — Traction, Two-Cylinder Compound (Marshall, Sons & Co., Ltd.), 810*
— — Traction. See also *Tractors*
— Trials, Tabulating Results, Work of Committee, 55. See LETTERS, 101. See also 818*, 835, 866*
— Winding. See *Winding*
— See also PARAGRAPH INDEX
Engineers' Education. See *Education; Apprenticeship*
— Institutions. See *Institutions*
— Mechanical, and Munitions Supply, 201
— Municipal, Duties of, 24
— and Public Health, 286
— and Public Service, 375
— Remuneration by Air Ministry, 862
— and Shipbuilders in Scotland, Institution of, Joint Summer Meeting with Institution of Naval Architects. See *Naval Architects;* Proposed Form of Bow Construction, by E. J. Spanner, 618
— Society of, H. A. Rickwood on Ferro-Concrete Cooling Towers, 776
Engineering, Agricultural, Oxford Institute of, Artificial Drying of Crops, 554*
— Apprentices. See *Apprentices*
— Chemical, Laboratory at University College, London, 682
— Degrees, London University, 831
— Education. See *Education; Apprentices*
— Electrical, 100 Years' Progress, 193. See 266
— Exhibition, Cardiff, 747, 766*, 808
— Industry, British, and Foreign Competition, 298. See 695, 725, 757
— — British and German, Hours and Wages, 757
— — British, and German Reparations, 695, 725, 757
— — Reduction of Manufacturing Costs, 419
— Irrigation, Principles of (Review), 631
— Laboratories. See *Laboratory; National Physical*
— and Machine Tool Exhibition. See *Machine Tool and Engineering Exhibition*
— Management (Review), 664
— Marine, French Navy, Committee on, 524
— — Treatise on (Review), 336
— Problems, Traffic on Great Lakes, 266
— Road, Treatise on (Review), 524
— Schemes in Parliament, 776
— Scholarships. See *Education.*
— Societies See *Institutions*
— Standards Association, Standardisation of Magnetos, 142; Standard Terms, Telegraphy and Telephony, 142; Standard Piston Rings, Motor Car Engines, 175; Standard Specifications, Iron and Steel Castings, Motor Car Manufacture, 176; Standard Steels, Motor Car Construction, 181; Specifications, Valves and Rims for Pneumatic Tyres, 261; Specifications for Silver Solder, 261; Specifications for Brass Ingots for Castings and Brass Castings, 261; Standard Specification for Copper, 425; Specification, Cast-Iron Pots for Piston Rings, 583; Specification, Resistance Materials, 651; Specification for Copper Cakes, 686; Standard Specification, Oil-Engine Fuels, 692; Standard Specification, Copper Conductors, 738; Specification for Spanners, 748; Standardisation of Colliery Requisites, 815; Standard Keys and Keyways, 878
— Students, Teaching Mathematics to, 491
— Teachers, Need for Training, 135. See LETTER, 166
— Work in Metropolis, 640, 647. See LETTERS, 676
— Works. See *Works*
English Electric Co., of Australia, Ltd., Sydney Harbour Bridge, 129*. See 169, 198*
English Electric Co., Ltd., Geared Turbines, 698*, 760*; Electric Locomotives for Montreal, 746
Entrance Lock, Gladstone Dock, Liverpool, 47*
Entropy Diagrams, Carville and North Tees Power Stations, 58*
— — Gaseous Working Substance, 215*
Erecting Shops, Turbine Manufacture, Brush Co.'s Works, 699*
Erskine, Heap & Co., Ltd., Switchgear, British Empire Exhibition, 106*
Erste-Brunner, Steam Turbine, Principles of Design, 69*. See 46; Efficiency of, 142
Esquimalt, Canadian Government Dock, 449*
Esthonia, Power Resources, 32. See 19
— Technical and Commercial Education, 122
— Estimates and Technical Costs, 582. See 433
European War, German Reparations and British Engineering Industry, 695, 725, 757
— — See also PARAGRAPH INDEX
Eutectic Alloys. See *Alloys* under *Metallurgy*
Evening Classes, London County Council, 377
Everest Expedition, Oxygen Cylinder, 187*. See *Errata*, 423; Ladder Bridge for, 304*
Everett, Edgcumbe & Co., Ltd., Recording Instruments, 207*
Excavating Machine, Electrically-Operated, Morwell Power Scheme, 299*
Exhaust, Diesel Engines, Temperature and Working Conditions, 544*
— Gases, Marine Diesel Engines, Temperature and Composition, 730, 751*. See 799
— Steam Piping, Mallet Simple Locomotive, 860*. See 795*
— — Reciprocal Utilisation in Industries, 75
— — Turbine. See *Turbine, Steam*
Exhibition, Agricultural, Leicester, 20*, 59*
— Brewers' Royal Agricultural Hall, 649
— British Empire. See *British Empire Exhibition*
— — Industries Fair, Birmingham, 524
— Cycle and Motor Cycle, Olympia, 652*
— Engineering, Cardiff, 747, 766*, 808
— Inventions, Institute of Patentees, 236. See 801
— Machine Tool and Engineering. See *Machine Tool and Engineering Exhibition*
— Motor Car, Olympia, 553, 574*, 606*. See 587
— Smithfield Agricultural Show, 807
— Trade, and Patent Novelty, 264
— See also PARAGRAPH INDEX
Expansion of Silica Bricks, 482
Experimental Tank. See *Tank; Ship Resistance*
Explosion, Boiler. See *Boiler Explosion*
— Gaseous. See *Gaseous Explosions*
Explosives, Use in Coal Mines, Statistics, 291
— See also *Guns and Explosives* in PARAGRAPH INDEX
Export Trade. See *Trade*; and *Industries* in PARAGRAPH INDEX
Extensometer, High-Temperature Tensile Tests, 816*
Extraction Pump, Centrifugal, for Condensing Plant, 5*
Extruded Metal, British Empire Exhibition, 335
Extrusion, Brass Rod, Inverted Process, 387*. See 379, 415

F.

FACING Machine. See *Machine Tools*
Factories, Welfare Work in. See *Labour*
Factory Accidents. See *Accidents*
— Bill and Boiler Explosions, 334
— Management. See *Works Management*
— Power Plants, Utilisation of Waste Steam and Surplus Power, 75
Fahlmann, E. G., on Stresses in Tubes, 378
Fairey Ambulance Seaplane, 593
Fairlie, D. M., on Determination of Sodium in Aluminium, 409
Fan, Mine-Ventilating, Sirocco, 160*
Fanmakers' Company Prize, Police-Court Ventilation, 754
Faraday Society, Discussion on Formation of Igneous Rocks, 587
Farming. See *Agriculture; Tractors*
Fatigue, Industrial. See under *Labour*
— Tests of Metals. See *Alternating Stress* under *Tests* (*Materials*)
Federated Malay States Railways, Penang Hills Railway, 664*, 726*, 789*, 852*
Feed Pumps. See *Pumps*
— Water Heater and Pump for Locomotives, Worthington-Simpson, 478*
— — Heating, Progressive, Steam Turbines, 57*, 64*, 469, 818*, 835, 866*
— — Meter, Boiler, Vee-Notch, Lea Closed-in Type, 598*
— — See also *Water*
Fellows Gear Shaper Co., Gear-Tooth Grinder, 402*; Thread Generator, 403*
Fereday-Palmer Stress Recorder, Use on Westminster Bridge, 296
Ferguson, Pailin, Ltd., Switchgear, 468*
Ferranti, Ltd., Calcium-Chloride Breathers for Transformers, 802*
Ferro-Concrete Arch Bridge, Timber Centring for, 257*
— — Arched Decking, Tirso Dam, 634*
— — Beam Tests, Quick-Hardening Cement, 867
— — Construction, Swedish Arch Dams, 76
— — Cooling Towers, 776
— — Design, Treatise on (Review), 618
— — Piles, Advantages of Ciment Fondu, 739
— — Piles, Bascule Bridge Foundations, 758*
— — Piling, Air-Pressure Consolidation, 414*
— — Structures, Damage in Sea Water, 775
— — See also PARAGRAPH INDEX
Ferrocrete Quick-Hardening Cement, Tests, 867
Ferrous Alloys, Research Committee, Work, 366
Ferry Steamer "Shoho Maru," Japanese Railways, 735*
Fertilisers, Artificial, See *Nitrogen.*
Field, A. B., on Large Alternators, 565
Fielding & Platt, Ltd., Oil Engine, 60*
File-Testing Machine, 447
Filon, Prof. L. N. G., on Shear Stresses in Tapered Girders, 789*
Filters, Air, Ventilation Purposes, 780
— Press for Transformer Oil, 768*
Filtration Plant, Shifting-Sand, Toronto Water Supply, 266
— — Water Supply, Egyptian Towns, 735
Finland, Copper and Gold Mining, 501
— Power Resources, 32. See 19
Finn Metal Company, Sherardising Plant, 277*
Finshyttan, Aktiebolaget, Tests of Lawaczeck Turbines, 851*
Fire Appliances, British Empire Exhibition, 153*, 383*, 426*, 530*
— Engines, Construction of, 672
— — Motor (Dennis Brothers, Ltd.), 383*
Fire Engines, Motor, Froth Producing, for Oil Fires (Merryweather & Sons, Ltd.), 530*
— — Motor, Hatfield Pump (Merryweather & Sons, Ltd.), 156*
— — Motor, Rees-Roturbo Pump (Leyland Motors, Ltd.), 156*
— — Motor (Stanley Fire Engine Co.), 386*
— Extinguisher, Chemical, Konus Kemik, 530
— — Motor-Cycle, 653
— Protection Service, British Empire Exhibition, 153*, 383*, 426*. See 530*
— Pump, Four-Wheel Trailer (Martin's Cultivator Co., Ltd.), 428*
— — Two-Wheel Trailer Type, Gwynnes, 147*; Dennis, 426*; Merryweather, 426*
— and Salvage Pumps, Greenwich Gem, 531*
Firebrick Arch, Boiler Furnaces, Pluto Suspended, 113*
— Powdered, Determination of Specific Gravity, 482
— Silica, Properties of, 482, 708
— See also *Refractory Materials*
Fireclay, Corrosion by Saltcake, Glass Furnace, 786
— Effect of Exposure, 481
— — of Sillimanite on, 461
Fireproof Bitumen Roofing Material, Tests, 166
Firth, T., & Sons, Ltd., Tool Steel and File-Testing Machine, 447
Fitting of Shafts in Holes. See *Gauging*
Fitzmaurice, Sir M., The Late, 710*
Flamm, Prof. O., Submarine Design, 837*
Flettner Rotor Ship, Theory of, 710, 770. See LETTER, 831*
Flexible Pipe Joints, Victaulic, British Empire Exhibition Colliery, 193*
Flight. See *Aeronautics*
Floating Dock. See *Dock*
— Pipe Lines for Dredging Work, 438. See *Erratum*, 486
Flooding, River Seine, Remedial Measures, 682*
Flow Indicators, Lubrication Systems, 422*
— — Water-Cooling Systems, 548
— Meters, Compressed Air (G. Kent, Ltd.), 193*
Fluid Friction. See *Friction; Hydrodynamics; Ship Resistance*
Flywheel, Ilgner Drive for Rolling Mills, 842*
Flying Boat. See *Seaplane* under *Aeronautics*
Fog, Electrical Precipitation, 648. See LETTER, 676
Folding Boat, the Collet, 843*
— Machine for Cloth, 250*
Food Investigation Board, Research on Heat-Insulating Materials, 682
Ford, Miss G. W., on the Effect of Iron on Copper, 379
Ford Motor Co., Proposed Works, Dagenham, 91
— — Wagon with Fire Pump, 386*
Forestry, Indian and Burmese, British Empire Exhibition, 507*. See 539, 548
— New Zealand, British Empire Exhibition, 290
Forging, Drop. See *Drop Forging* and *Hammers* under *Machine Tools*
— Hammer. See *Hammer* under *Machine Tools*
— Machine, 5-Hammer, for Swaging (T. Ryder & Son, Ltd.), 407*
— — Universal (B. & S. Massey, Ltd.), 407
— Press. See *Press* under *Machine Tools*
— Steel, Clink Detector for, 658*
— and Upsetting Machine (Selson Engineering Co., Ltd.), 407*
Forrest Lecture on Electrical Progress, 56
Föttinger Hydraulic Clutches, Diesel-Engine Drive, M.S. "Vulcan," 92*, 369*
Foundation Blocks, Eccentrically Loaded, Stress Distribution, 763*
— Earth Stresses Due to Loaded Surface, 1*, 156*
— Piers, Irish Bascule Bridge, 758*
— Settlements, London Bridges, 641. See 102, 647, 676, 807
Foundry Plant, Drying Stoves, Gas and Coke Firing, 460
— Work, Metal Moulds for Iron Castings, 377
— See also *Castings; Moulding*
Four-Wheel Drive Lorry Co., Ltd., Petrol-Driven Rail Car, 817*
Fowler, J., & Co. (Leeds), Ltd., Rein-Drive Tractor, 20, 59*; Cable Ploughing Tackle, 382, 807; Anti-Balance Plough, 516*; Steam Wagon, 855*
Fox, Sir Francis, Autobiography (Review), 714
Frame, Motor-Cycle, Francis & Barnett, 653*
France, High-Tension Power-Transmission Lines, 78, 80
— Industrial Position, Report, 332
— Power Resources, 32. See 19, 42
— River Seine Regulation Works, 682*
— Water Power in, 42
— See also *French*
Francis & Barnett Motor-Cycle Frame, 653*
Francis Turbines. See *Turbines, Hydraulic*
Francis, W., & Co., Ltd., Electric Light Fittings for Collieries, 529*
Franklin Institute, Centenary Celebrations, 745; Prof. A. A. Michelson on Velocity of Light, 738
Fraser & Chalmers Engineering Works, Robins Coke Conveyor, 512*
Frazil Ice Troubles, Water Power Plants, 73, 241*. See 45, 463
Freeman, S. B., on Oil Fuel for Marine Propulsion, 836
French African Colonies, Railway Requirements, 674
— Cast-Iron Arch Railway Bridge, Repairs, 557
— Coast Defence Measures, Report, 170
— Government and Synthetic Ammonia Production, 263. See 372
— Navy, Committee on Marine Engineering, 524
— — Estimated Expenditure, 780
— — New Construction, 453, 572, 582, 871
— — Recruitment of Officers from Ecole Polytechnique, 554
— — Reorganisation of High Command, 839
— — Scientific Research, 854
— — Submarines for Convoy Duty, 587
— Power Plant Legislation, 37
— Society of Civil Engineers. See *Civil Engineers*
— See also *France*
Friction Clutch. See *Clutch* and *Motor-Car Details*
— Skin, in Aeronautics, Theory of, 742. See LETTER, 831*
Frictional Resistance. Ships. See *Ship Resistance*
Froth Producing Fire Engine, Oil Fires, 530*
Froude National Tank, Report on Work, 334
Fruit Transport, Cold Storage, 743*
Fryer, E. H., on Motor-Car and Street Lighting, 260
Fuel, Alcohol, Production and Uses, 77
— Brown Coal and Lignite, Occurrence and Use, 480
— Calorific Value, and Boiler Trials, 55. See LETTERS, 101
— Coke, for Steam Raising, 40, 82
— Conservation, United States Shipping Board Steamers, 714
— Consumption, Diesel Engines, Report, 715
— — Electric Power Stations, 377
— — Marine Oil Engines, Report, 730, 750*, 784*, 798
— — St. Pancras Power Station, 642*
— Economy in Austria, 41
— — Complete and Incomplete Combustion, 40*
— — Importance of Temperature Measurement, 40
— — and Low-Temperature Carbonisation. See *Coal, Low-Temperature Carbonisation*
— — in Marine Propulsion, 25
— — and Use of Gas, 82
— Injection, Diesel Engines, Arschaouloff System, 29*
— — Pump, Gardner Oil Engine, 598*
— — Spring-Plunger System, Blackstone Oil Engine, 60*, 630*. See 21
— Low-Temperature Carbonisation of Coal. See *Coal, Low-Temperature Carbonisation*
— Motor. See also *Alcohol; Gas; Motor; Paraffin; Petrol; Producer*
— Natural Gas, Measurement, Compression and Transmission (Review), 620
— — Gas Supply, Edmonton, Canada, 539
— Oil. See *Oil Fuel*
— Pump. See *Pump*
— Research Board: Coal Survey and Low-Temperature Carbonisation, 232. See 19, 31, 552; Carbonisation of Seaweed, 233; Investigation of Arley Coal Seam, 552; Work of, 523; Trials of Parker Low-Temperature Carbonisation Plant, 589*
— Resources of Canada, 38, 480. See LETTERS, 102; of Russia, 82; of Sweden, 38
— Smokeless. See *Coal, Low-Temperature Carbonisation*
— Supplies, Co-ordination of, 82
— Supply for Marine Propulsion, 119
— World's Resources, 18, 31
— See also *Coal; Oil; Gas; Peat; Pulverised Coal*
Fullagar Marine Oil Engine, Piston Removal, 145*; Trials of M. S. "British Aviator," 236, 369
Fumes, Electrical Precipitation, 648. See LETTER, 676
Funicular Railway, Penang Hills, 664*, 726*, 789*, 852*
Furnaces, Blast, Gas Blowing Engines, Working Results, 830*
— — Pipe Manufacture from Slag, 600
— Boiler, Air Preheater, Rectangular Tubes, 209*
— — Clinker Formation in, 548
— — Coal Measuring Apparatus, 242*, 598*
— — Marine, Alternative Coal or Oil Firing, 346*
— — Pluto Suspended Arch, 113*
— — See also *Stoker*
— Electric, Automatic Temperature Control, 451*
— — for Fusing Silica, 848
— — Hardening End Gauges, 128*
— — High-Frequency, Ajax-Northrupp, 6
— — Iron Smelting, Resistance of Coke and Charcoal, 637
— — Iron and Steel Manufacture, 117
— — Production of Synthetic Cast-Iron, 276
— — as Radiation Standard, 101
— — Resistance, with Reaction Zone, 116
— — Resistance, for Zinc Smelting, 449
— Gas, Automatic Temperature Control, 628*
— Glass, Fireclay Corrosion by Saltcake, 786
— — Properties of Sandstone Blocks, 786
— Industrial, Pulverised Fuel for, 198, 480
— Metallurgical, Oil-Fired, Wallsend-Howden Burner, 347*
— — Pulverised Coal for Firing, 198, 480
— Open Hearth, Steel Manufacture, Classification of Scrap, 806
— Temperature Measurement and Fuel Economy, 40
— See also *Coke Ovens; Cupolas*
Fused Silica Lenses, Ultra-Violet Light, 296
— — Mercury Vapour Lamp, Kinematography, 295*

G.

GABY, F. A., on the Queenston-Chippawa Development, 220*, 255*. See 267
Galloways, Ltd., Gas Blowing Engines, Working Results, 830*
Galloway Motor-Car, 574
Galvanised Iron Sheets, Testing, 825*
Galvanising, Sherardising Process, Inception and Development, 277*
Gamma Rays, Scattering of, 323
Gardner Oil Engines, British Empire Exhibition, 595*
Gas, Carbon Dioxide. See *Carbon Dioxide*
— Combustion of. See *Gaseous Explosions*
— Critical Radiation Potentials, 322
— Cylinder, Oxygen, Vibrac Steel, 187*. See *Errata*, 423
— Department, Birmingham, Research Laboratory, Industrial Kinematography, 295*
— Engine. See *Engine, Gas*
— Engineers, Institution, Annual Meeting, 23
— Exhaust, Marine Diesel Engines, Temperature and Composition, 730, 751*. See 799
— Fired Drying Stoves, Comparisons with Coke Firing, 460

Gas Fired Furnaces. See *Furnaces*
— Flow Measurements, Balanced Manometer, 223*
— Lighting, British Empire Exhibition, 259
— — Development of, 81
— Liquefaction of, Research Work. Toronto University, 367
— Manufacture, Doppelgas Process, 37
— — Liquid By-Products, 38
— — Refractories for, 23
— — Removal of Carbon Monoxide, 23
— — Testing Water Gas Plants, 682
— — Travers-Clark Regenerative System, Aylesbury, 23
— — Waste-Heat Boilers with Vertical Retorts, 23
— — Waste Liquors, Treatment, 128
— Meter, Thomas Electrical, 182*. See *Errata*, 262
— Natural, at Edmonton, Canada, 539
— — Measurement, Compression and Transmission (Review), 620
— Poisonous, Respirators for Use in, 149*
— Producer. See *Producer*
— Spectra at Low Temperatures, 367
— Supply in Liverpool, 682
— — Schemes in Parliament, 777
— Temperature Gradients at Various Pressures, 686
— — Measurements by Thermo-Couples, 686
— Town, Industrial Uses, 82
— — Smoke Abatement and Fuel Economy, 82
— Turbine. See *Turbine*
— Welding. See *Welding*
— Works, Dalmarnock, Low-Temperature Carbonisation Plant, 491, 682
— See also *Carbon Dioxide* ; *Carbon Monoxide* ; *Hydrogen* ; *Nitrogen* ; *Oxygen*, &c.
Gaseous Explosions, Activation of Nitrogen, 448
— — Missing Pressure and Heat Loss, 605, 623*, 629*, 679, 684. See LETTERS, 641, 704, 746
Gasoline. See *Petrol* ; *Engine, Petrol* ; *Carburettors* ; *Aeronautics*
Gate-End Conveyor, Loading Colliery Tubs, 227*
— — Switch (Switchgear & Cowans, Ltd.), 180*
— Sluice, Automatic, Spillway, Tirso Dam, 635*
Gauges, Block, Measuring Machine for, 129*
— End, Comparison with Line Standard, 128*
— — Electrical Method of Hardening, 128*
— — Sensitive-Level Comparator, 129*
— Interference Method of Testing, 129*
Gauging Appliances for Gear Teeth, 696*, 821*
— Fitting of Shafts and Holes, German Tolerances, 150
Gear Boxes, Motor-Car. See *Motor-Car Details*
— Change-Speed, Hydraulic Clutches, Oil-Engine Locomotive, 702*
— Cutting Machines. See *Machine Tools*
— Double Helical, Sunderland Planer for Cutting, 363*
— Hydraulic, Variable-Speed, Armstrong Swash-Plate Engine, 187*
— — Variable - Speed, Williams - Janney, Winches with, 211*
— Power Transmission, Variable-Speed, 86, 842
— Reduction, Worm and Spur, Spence-Wild, 251*. See 622*
— Reversing. See *Reversing*
— Tooth Measuring and Testing Appliances, 696*, 821*
— Wheel. Double-Reduction, for Marine Turbine (Vickers, Ltd.), 100*
— Worm, Generating and Hobbing Machines, 401*
— — Grinding Machine for Worms, 405*
— — Testing Machine for, 823*
Geared Turbines (English Electric Co., Ltd.), 698*, 760*
— — Locomotive, Reid-MacLeod, 479*
— — Marine. See *Marine Propulsion*
Genders, R., on Extrusion of Brass Rod, 387*. See 379, 415
General Electric Co., Ltd., Transport of Turbo-Alternator Stator, 370, 552 ; Manufacture of Thermionic Valves, 456 ; Rectifying Valves and Water-Cooled Valves, 492*
General Electric Co., U.S.A., Oil-Engine Driven Electric Locomotive, 781*
General Vehicle Co., Electric Vehicles, 689*. See 719
Generating Machine, Gear. See *Gear* under *Machine Tools*
— Station. See *Power Station*
Generators, Electric, 100 Years' Progress, 193. See 266
— — Air-Turbine Driven, Colliery Lamp, 430*
— — Alternating Current, Design of Large Units, 565
— — Alternating-Current, Developments, 79
— — Austin Constant-Current System, 734*
— — Brush System of Stator Windings, 71*
— — and Cold-Starting Oil Engine (National Gas Engine Co., Ltd.), 21*
— — Direct-Current, Oil-Engine Driven Shunting Locomotive, 781*
— — 10,250-k.v.a., Newfoundland Water-Power Plant, 127*
— — 45,000-k.v.a., Queenston - Chippawa Plant, 256*. See 220*, 267
— — Transmitter for Speed Recorder, 208*
— — Undercutter for Commutator Insulation, 621*
— — Welding Machine, Stator Windings, 764*
— — Wind-Driven, Use in Agriculture, 382. See also 60, 77
— — See also *Turbo-Alternators* ; *Turbo-Generators*
Geological Society, Discussion on Formation of Igneous Rocks, 587
Geology, Formation of Igneous Rocks, 588
Gerbel, B. M., Utilisation of Waste Energy, 75
German Engineering Industry, Hours and Wages in, 757
— French Agreement, Synthetic Ammonia Manufacture, 263. See 372
— Fleet, Sunken, at Scapa Flow, Salvage Work, 233*. See 373
— Iron and Steel Industry, Position of, 228
— Practice, Back-Pressure Turbines, 41
— Reparations, Dawes Plan, and British Engineering Industry, 695, 725, 757
German Submarines, Prof. O. Flamm's Design, 837*
— Tolerances, Fitting of Shafts and Holes, 150
— Trade. See also *Trade* and PARAGRAPH INDEX
Germany, Diesel Engines, Development, 110*. See 83
— Electric Power in Industry, 85 ; in Agriculture, 116
— Industrial Standardisation, 120, 149
— Large-Power Gas Engines, 105*. See 83
— Railway Electrification, 118
— Technical Schools and Industrial Concerns, Co-operation, 122
Gibson, R. E., on Gas Supply in Liverpool, 682
Gibson, Prof. A. H., Tests of Lawaczeck Turbines, 851*
Gideabacka Dam, Sweden, Design, 76
Gies Foundry, Petrol-Measuring Pump, 141*
Gilkes, G., The Late, 268
Gill and Chaviara System, Electric Transmission, Road Vehicles, 689
Ginning Machines, Cotton, British Empire Exhibition, 11*
Girders, Effect of Taper on Shear Stresses, 789*
— Hack-Sawing Machines for, 320*, 445*
— Hooks, Stresses in, United States Investigations, 491
— See also *Beams* ; *Bridges*
Gladstone Dock, Liverpool, Construction, 47*
Glasgow Corporation, Smokeless-Fuel Plant, Dalmarnock, 491, 682
— Street Lighting in, 458
Glass Annealing and Re-annealing, 548
— Furnace, Fireclay Corrosion Saltcake, 786
— — Properties of Sandstone Block, 786
— Industry, United States, Position, 592
— Models for Stress Determination. See *Optical Determination of Stress*
— Selenium, Colourless, Effect of Arsenious Oxide, 786
— Technology, Society of : United States Glass Industry, by Prof. W. E. S. Turner, 592 ; Note on the Glasshouses of the Leeds District in the 17th, 18th and early 19th Centuries, by F. Buckley, 786 ; Fireclay Corrosion through the Action of Saltcake, by Prof. W. E. S. Turner, 786 ; Properties of a Sandstone Block after Use in a Glass Furnace, by H. S. Houldsworth, 786 ; Production of Colourless Glass in Tank Furnaces with Special Reference to the Use of Selenium, Part IV. Influence of Arsenious Oxide, by A. Cousen and Prof. W. E. S. Turner, 786
Glasshouses, Leeds District, Historical, 786
Glassware, Volumetric, National Physical Laboratory Tests, 378
Gleason Works, Gear-Tooth Gauges, 696*
Glenfield & Kennedy, Ltd., Self-Closing Valves, 143* ; Jet Dispersers, Water Discharge, 247*
Glossary, Standard Terms, Telegraphy and Telephony, 142
Glover, A. W., The Late, 518
Glycerin, Dehydration of Alcohol by, 344
Gobey, F. E., The Late, 518
Godfrey Engineering Works, Oxygen-Jet Cutting Machine, 124*
Gold Coast, French, Railway Requirements, 674
— Mining and Extraction, South Africa, 204*. See 174
— — Robeson-Davidson Slime Pump, 174
— Washing, Finland Rivers, 501
Goninan Bridge Corporation, Design for Sydney Harbour Bridge, 129*. See 169, 198*
Goodwin, Vice-Admiral Sir G., on Marine Propelling Machinery, 669
Gordon System, Photographic Surveying, 142
Gould & Eberhardt, Gear-Testing Apparatus, 697*
Governing Gear, Gardner Oil Engine, 596*
— — 1,000-k.w. Geared Turbo Generator, 761*
— — 14,000-h.p. Hydraulic Turbines, Newfoundland, 127*
— — Hydraulic Turbines, Oil-Pressure, 610*
— — Hydraulic Turbines, Queenston-Chippawa Development, 256. See 220
— — Two-Speed Oil Engine, (Vickers-Petters, Ltd.), 643*
Government Aid, Egyptian Industries, 586
— Chemical Activities, Historical Account, 448
— Control, Colliery Industry, Report, 293
— Management of Power Plants, 209
— Policies, Power Development, 37
— Railways. See *State Railways*
— Trained Students and Whitworth Scholarships, 741. See LETTERS, 746, 770, 810, 831, 861
Graham, J. I., on Somerset Oil Shales, 777
Grain Elevator, Bristol, Oil Engines for, 643*
Grantham, R. F., The Late, 486
Grass, Cultivating Machine for, 807
Grates. See *Furnace* ; *Stoker*
Graticule, Fractional Reading, for Measuring Telescopes, 101*
Graving Dock. See *Dock*.
Gravity, Local Variations, Report on, 410
Gray, Sir W. C., the Late, 654
Great Britain, Present Economic Position, 617
— Lake Hydro-Electric Scheme, Tasmania, Self-Closing Valve for Pipe Line, 143*
— Lakes, Cargo Steamers with Unloading Conveyors, 723*. See *Erratum*, 863
— — Traffic on, Engineering Problems, 266
— Northern Telegraph Company, Cable-Laying Steamer, 196*, 269*
Greathead Shield, London Tube Railway Construction, 640
Green, E., & Sons, Ltd., Air Preheater, 209*
Green Flash, Setting Sun, Experimental Demonstration, 410
Greenland, North West, Survey of, Danish Expedition, 344
Greenwich Gem Fire and Salvage Pumps, 531*
Gresham & Craven, Ltd., Mechanical Lubricator, 163*
Griffiths, Dr. E., Refrigeration Research, 742*
Griffiths, H., on Crystallisation, 738
Grinding Machines. See *Machine Tools*
Grossmann, M. A., on High-Speed Steel, 347, 393
Grove-road Power Station, Tests of Turbo Generator, 704
Grubb, Sir H., & Sons, Ltd., Solar Spectrograph, Poulkovo Observatory, 87*
Guards, Safety, for Power Presses, 18
Gullspång Dam, Sweden, Design, 76
Guns, Anti-Aircraft, 4-in. High Angle (Wm. Beardmore & Co., Ltd.), 188*
— — Aircraft, New American Weapons, 204
— Armstrong, Early Breech Loading, 185*
— 4½-in. Howitzer (Armstrong, Whitworth & Co., Ltd.), 186
— Metal, Admiralty, Effect of Casting Temperature and Mass, 436*. See 409
— Mountings, Armstrong Swash-Plate Engine, 187*
— Power, United States Battleships, and Washington Treaty, 331
— 6-pdr. Tank (Armstrong, Whitworth & Co., Ltd.), 186*
— See also *Explosives* ; *Projectiles* ; *Warships* ; and PARAGRAPH INDEX
Gunboats. See *Warships*
Gunfire, Protection of Naval Aeroplanes, 418
Gunpowder. See *Explosives*
Gutta Percha, Preparation and Properties, 676
Gwynnes Engineering Co., Ltd., Pumping Machinery, British Empire Exhibition, 2*, 218* ; Trailer Fire Pump, 147* ; Centrifugal Pump, Coal Washing Plant, 413* ; 8-h.p. Motor Car, 577*
Gwynne-Pennell Rotary Trap, Centrifugal Sewage Pumps, 218*

H.

HABER Process, Synthetic Ammonia Manufacture, Franco-German Agreement, 263. See 372
Haboobs, Sudan Sandstorms, Notes on, 592
Hack-Saw Blades, Sharpening Machine for, 405*
— Sawing Machine. See *Machine Tools*
Hacking & Co., Ltd., Cloth Folding and Measuring Machine, 250*
Hadfields, Ltd., Projectiles and Armour Plates, British Empire Exhibition, 189* ; Creepers for Colliery Tubs, 338*
Hadfield, W. J., on Modern Road Making, 692
Hadley, Dr. A. T., on Management of Power Plants, 209
Hair Hygrometers, National Physical Laboratory, 278*
Haldane, Dr. J. S., on the Industrial Machine, 585
Hall, J. & E., Ltd., Refrigerating Plant, 561*
Hall, M. L., the Late, 832
Hammar, H. G., on Power for Ship Propulsion, 148. See 120
Hammers. See *Machine Tools*
Hanson, Dr. D., on Iron and Oxygen, 366 ; on Effect of Iron on Copper, 379
Harbour, Colombo, Depth Requirements, 457
— Copenhagen, Proposed Bridge, 292
— Montreal, Electric Locomotives for, 746
— New York, Dredging Approaches, 713
— — York, Motor Tug, Diesel-Electric, 714
— Toronto, Development of, 266
— Tripoli, Position and Possibilities, 828
— Works, Deterioration and Preservation of Marine Structures (Review), 589
— — Deterioration of Structures, 774
— — Schemes in Parliament, 777
— See also PARAGRAPH INDEX
Hardening Metals. See *Heat Treatment* under *Metallurgy*
Hardness Tests. See *Tests* (*Materials*)
Harland & Wolff, Ltd., Motor Launch "Invermira" for Venezuela, 800*
Harmonic Analysing Instruments, Wave Form, Alternating Currents, 651, 876*
Harrison, H. T., on Electric Lighting, British Empire Exhibition, 259
Harvesting Machine, Sunshine Combined Reaper and Thresher, 383
Haslam Foundry & Engineering Co., Ltd., Refrigerating Machinery, British Empire Exhibition, 290*, 559*
Hatfield Pump, Merryweather Motor Fire Engine, 156*. See 426*
Haulage, Colliery, Compressed Air Locomotives, Compressor for Charging, 498*
— — Electric Battery Locomotive, 252*
— — Electric Putter (Mavor & Coulson, Ltd.), 252*
— Gear, Colliery, Electric, Main and Tail, (D. Ashton & Co., Ltd.), 760*
— — Colliery, Main and Tail Type (M. B. Wild & Co., Ltd.), 251*, 622*
— — Colliery, Endless-Rope Type (Markham & Co., Ltd.), 251*
— — Colliery, Portable Types (Markham & Co., Ltd.), 251*
— — Colliery, Portable Stretcher-Bar Type (Holman Bros., Ltd.), 252
— — Colliery, Steam and Compressed Air (J. Mills & Co.), 766*
— — Colliery, Steam, Air and Electric (Holman Brothers, Ltd.), 732*
Hauling Engine, Electric, Penang Hills Railway, 789*, 852*
Hawksley Lecture on Marine Propelling Machinery, 669
Hawthorn, Leslie & Co., Ltd., Naval Construction, 421 ; Lubrication Tell-Tales, 422*
Hay Drying by Hot Air, 554*
Hayward-Tyler & Co., Ltd., Pumping Machinery, 3*
Head, Wrightson & Co., Ltd., Coal-Screening Plant, 338*
Heald Internal Grinding Machine, 404*
Healey, A., on Motor-Car Tyres, 805
Heat Conductivity Measurement, National Physical Laboratory, 279*
— Engines. See *Engines* ; *Turbines* ; *Aeronautics*
— Insulating Materials, Cold Stores, Conductivity Tests, 742*
— — Material, Spongy Rubber, Research 682.
— Losses, Fuel Combustion, 40*
— — in Gas Engines, 605, 623*, 629*, 679, 684. See LETTERS, 641, 704, 746
— Treatment of Metals. See *Metallurgy*
— Waste. See *Waste Heat*
Heater, Air, for Boiler Furnaces, Rectangular Tubes, 209*
— Electric, for Rivets (A.I. Electric Welding Appliances Co.), 828*
— Feed-Water. See *Feed-Water Heater*
Heating, Domestic, Use of Electric Power, 84
— and Pumping Unit, Wallsend-Howden Oil-Fuel System, 345*
— Steam, Automatic-Temperature Control, 628*
— — Extraction from Turbines, 41, 744. See 503
— and Ventilating Engineers, Institution of, Air Washers and Air Filters, by H. W. S. Martin, 780
Heatly-Gresham Engineering Co., Ltd., Drop Stamping Installations, 705*
Hele-Shaw Variable Speed Gear, 86 ; Irish Bascule Bridge, 759*
Helical Gears. See *Gears*
Helium Atom, Metastability of, 322
— Liquefaction of, Toronto University, 367
Hellström, B., Swedish Arch Dam Design, 76
Hematite Prices. See *Metal-Price Diagrams*
Henderson, Prof. Sir J. B., on Teaching Mathematics, 491
Hendon-Edgware Extension Railway, Automatic Substation, 227* ; Opening, 260
Henley's Telegraph Works Co., Ltd., Research Laboratories, 736*
Herbert, A., Ltd., Radial Drill, 316* ; Milling Machines, 356 ; Fellows Gear-Tooth Grinder, 402* ; Fellows Thread Generator, 403* ; Heald Internal Grinder, 404*
Herbert, E. G., Ltd., Hack-sawing Machines, 319* ; Sharpening Machine, Hack-saw Blades, 405* ; Testing Machines, Hack-saw Blades and Tool Steel, 445*
Herdman, Sir W. A., the Late, 141
Heterochromatic Photometry, International Committee, 175
Hetherington, J., & Sons, Ltd., Cotton Machinery, British Empire Exhibition, 90*
Hichens, W. L., on Industrial Problems, 298
High-speed Steel. See *Steel*
— Temperature Tests. See *Tests* (*Materials*)
Highways. See *Roads*
Hilger, A., Ltd., Interferometers, Calibration of Standard Metre, Japanese Government, 491* ; Testing Photographic Lenses, 6
Hill, J., & Son (Keighley), Ltd., Nelson Dobby, Cotton Weaving, 249*
Hilomill Vertical Boring Mill, 313*
Hiloplane Planing Machine, 362*
Hjorth, B. A., & Co., Adjustable Wrenches and Spanners, 113*
H.M.S.S. See under *Warships*
Hobbing Machines, Gear. See *Gear* under *Machine Tools*
Hoists, Steam, Air and Electric, Mining, 732*
— See also *Cranes*
Hoisting Engine, Electric, Penang Hills Railway, 789*, 852*
Holbrook & Sons, Tool-Room Lathe, 356*
Holden & Brooke, Ltd., Turbine Pump, 159*
Holes, Fitting of Shafts in. See *Gauging*
Holland, Domestic Uses of Electric Power, 84
— Electric Power Transmission and Distribution, 78
— Electricity Supply Regulations, 37
— Engineering Education in, 122
— Power Resources, 32. See 19
— See also *Dutch*
Holley Carburettor Company, Iron Castings in Metal Moulds, 377
Hollings & Guest, Ltd., Sludge Pump, 211*
Holman Brothers, Ltd., Air Compressors, British Empire Exhibition, 192 ; Stretcher-Bar Mine Hoist, 252 ; Pneumatic Tools, 528 ; Mine-Haulage Equipment, 732*
Holroyd, J., & Co., Ltd., Combination Turret Lathe, 357* ; Worm-Wheel Hobbing Machine, 401* ; Worm-Grinding Machine, 405* ; Woodworking Tool Grinder, 405* ; Oil-Groove Cutting Machine, 444*
Holzwarth Gas Turbine, 83
Home Office Regulations, Lead Poisoning, Accumulator Factories, 753
— — Report, Factory Accidents, 773
— — Report, Safety Precautions, Power Presses, 18
Homer, A. B., on the M.S. "Cubore," 714
Hood, D. W., the Late, 650*
"Hood," H.M.S., Steel Casting for Rudder Frame, 189*
Hooks, Stresses in, United States Investigations, 491
Hopper Dredger. See *Dredger*
— Wagon, Coal, 42-ton, Bengal-Nagpur Railway, 279*
Horner, J., on Gear-Tooth Testing, 696*, 821*
Hospital Ship, Motor, Shallow-Draught, the "Nabha," 421*
— Steamers, Conversion for Tourist Service, 463*
Houldsworth, H. S., on Clay-Sillimanite Mixtures, 461
Hours of Labour. See *Labour*
House-Refuse Collection, Pagefield System, 655*
Howe, Prof. G. W. O., on a Hundred Years of Electrical Engineering, 193. See 266
Howitzers. See *Guns*
Howson, C. W. H., on Gutta Percha, 676
Hughes, J., the Late, 15
Hugill, W., on the Effect of Exposure on Fireclay, 481 ; on Determination of Specific Gravity of Firebricks, 482
Hultgren, A., on Brinell Tests and Production of Steel Balls, 367
Humber Motor Cycle, 653*
— River Water Power Scheme, Newfoundland, 125*
Humidifying Apparatus, Air, Textile Mills, Andrew System, 873*
Humidity Measurements, National Physical Laboratory, 278*
Humpage, Thompson & Hardy, Hack-Sawing Machine, 320*
Hungarian Practice, Turbo Alternators, 80, 206
— Railways, Electrification, 118
Hungary, Power Resources, 32. See 19

Hunsaker, Commander J. C., on Aeronautics in Naval Architecture, 722. See 713
Hunter, C., on Oilfields of Argentina, 651
Hunter, H., on a Double-Acting Marine Diesel Engine, 26*
"Hurghada." Motor Tug for Egypt, 517*
Hydraulic Clutches. Change-Speed Gear, Oil-Engine Locomotive, 702*
— — Föttinger, Diesel-Engine Drive, M.S. "Vulcan," 92*, 369*
— Machine Tools. See *Machine Tools*
— Power Plant. See *Power Plant*
— Press. See *Press* under *Machine Tools*
— Pump. See *Pump*
— Thrust Measuring Gear, Michell, Marine Diesel-Engine Trials, 785*
— Turbines. See *Turbines; Power Plant*
— Variable Speed Gears, 86, 842
— — Speed Gear, Hele-Shaw, Irish Bascule Bridge, 759*
— — Speed Gear, Armstrong Swash-Plate Engine, 187*
— — Speed Gear, Williams-Janney, Winches with, 211*
Hydraulics, Jet Disperser Water Discharge, 247*
— Water Channels, Automatic Intake Control, 432*
— See also *Hydrodynamics; Irrigation; Water*
Hydrodynamics, Bjerknes' Experiments, Pulsating Capsules, 409
— Oil Flow in Pipe Lines, 792, 823*, 853*
— See also *Ship Resistance*
Hydro-Electric Power Plant. See *Power Plant*
Hydrogen Diffusion in Iron and Steel, 365
Hydrogenation of Coal, 38, 777
Hygiene, Engineers and Public Health, 286
Hygrometry, National Physical Laboratory, 278*

I.

ICE Troubles, Water Power Plants, 45, 73, 241*, 463
— See also *Refrigeration*
Igneous Rocks, Formation of, 588
Ignition, Internal-Combustion Engines, Standardisation of Magnetos, 142
Igranic Electric Co., Ltd., Motor Starting and Control Panels, 447; Automatic Motor Starter and Dean Valve-Control Gear, 671*
Ilgner System, Electric Drive, Sheet Rolling Mills, 842*
Illinois Tool Works, Gear Testing Apparatus, 821*
— University of, Fatigue Tests of Metals, 580*, 658.* See 284
Illuminating Engineering Society, Conference at British Empire Exhibition, 259
Illumination, Gas and Electric, British Empire Exhibition, 259
— Gas Lighting, Development of, 81
— International Commission, Work of, 175
— National and International Aspects, 77. See 175
— Progress with Electric Lamps, 77
— Road, and Motor-Car Traffic, 260. See 458
— Standard, Proposed International, 175
— Vocabulary of, 175
— See also *Light; Lighting;* and *Lamps* under *Electric*
Illuminator, Vertical, for Microscopes, 30*
Impact Tests. See *Tests (Materials)*
Imperial Communications, Aeroplanes and Airships for, 450
— Shipping Committee, Depth of Colombo Harbour, 457
Import Trade. See *Trade*
Impregnating Plant, Experimental, Henley's Cable Works, 737*
Impulse Turbines. See *Turbines*
Incandescent Lamps. See *Lamps* under *Electric*
India, Bengal-Nagpur Railway, Hopper Coal Wagon, 279*
— Bombay Water Supply, Lake Tansa Pipe Line, 562*
— Calcutta Water Supply, 178
— Early Use of Mechanical Transport, 681
— Power Resources, 19, 31
— Research Work, Report of Institute of Science, 674
— Rubber. See *Rubber*
Indian Exhibits, British Empire Exhibition, 507*, 537*. See LETTER, 548
— Trade Statistics, 276, 306
Indicator Connections, Internal-Combustion Engines, 424
— Diagrams, Air Compressor, British Empire Exhibition Colliery, 192*
— — Ammonia Compressor, 561*
— — Blackstone Oil Engine, 639*
— — Determination of Clearance Volume, 101*
— — North-Eastern-Werkspoor Double-Acting Diesel Engine, 27*
Induction Furnaces. See *Furnace, Electric*
— Motor. See *Motor, Electric*
— Regulators (Switchgear & Cowans, Ltd)., 181*
Industrial Accidents. See *Accidents*
— Agreements and Disputes. See *Labour*
— Alcohol. See *Alcohol; Motor Fuels*
— Chemistry. See *Chemistry*
— Concerns, German, Co-operation with Technical Schools, 122
— — Reciprocal Utilisation, Waste Energy, 75
— Decentralisation and Electric Power, 185
— Economics. See *Labour*
— Fatigue. See *Labour*
— Furnaces. See *Furnaces*
— Kinematography, Mercury-Vapour Lamp, 295*
— Management. See *Works Management*
— Notes. See *Labour Notes* under *Labour*
— Organisation, Munitions Supply, 201
— Research. See *Research*
— Standardisation. See *Standardisation*
— Unrest. See *Labour*
— Uses of Electric Power, 85
— Uses, Town Gas, 82
— Welfare. See *Welfare* under *Labour*
Industries, British, Effect of Taxation, 618
— Present Position, 617
Industries Egyptian, State Assistance, 586
— French, Present Position, 332
— Lithuanian, Report, 268
— See also *Trade* and PARAGRAPH INDEX
Industry, Coal Mining, Economics, 518*, 521
— Electric Supply, Development, 617
— Engineering, British and German, Hours and Wages, in, 757
— — British, Effect of German Reparations, 695, 725, 757
— — Reduction of Manufacturing Costs, 419
— Foreign Trade and International Competition, 298
— German Iron and Steel, Position, 228
— Iron and Steel, Position, 365
— Labour Situation, Need for Co-operation, 585
— Motor Car, British, Position, 553, 587
Ingall, D. H., on Relationship between Tensile Strength, Temperature and Cold Work, 408
Ingersoll-Rand Co., Oil-Engine Driven Electric Locomotive, 781*
Inglis, G., the Late, 133
Ingots, Steel, Clink Detector for, 658*
Injection, Fuel, Spring-Plunger System, Blackstone Oil Engine, 20*, 639*
Inland Navigation. See *Navigation; Canals; Rivers, &c.*
Inspection, Boiler, Report on, 417
Institute of Patentees. See *Patentees*
— of Science, Indian, Report, 674
— of Transport. See *Transport*
— See *Institutions*
Institutions, Technical and Scientific. See *Aeronautical Society, Royal; Agricultural Society, Royal; Arts, Royal Society of; Automobile Engineers, Institution of; British Association; Ceramic Society; Chemical Engineers, Institution of; Chemical Industry, Society of; Civil Engineers, French Society of; Civil Engineers, Institution of; Cold Storage and Ice Association, British; Diesel Engine Users' Association; Electrical Engineers, Institution of; Engineers and Shipbuilders in Scotland, Institution of; Engineers, Society of; Faraday Society; Glass Technology, Society of; Gas Engineers, Institution of; Geological Society; Heating and Ventilating Engineers, Institution of; Iron and Steel Institute; Iron and Steel Institute, American; Illuminating Engineering Society; Junior Institution of Engineers; Liverpool Engineering Society; Locomotive Engineers, Institution of; Manchester Association of Engineers; Marine Engineers, Institute of; Mechanical Engineers, American Society of; Mechanical Engineers, Institution of; Mechanical Engineers, Japanese Society of; Metals, Institute of; Meteorological Society, Royal; Mining Engineers, Institution of; Municipal and County Engineers, Institution of; Naval Architects, Institution of; Naval Architects and Marine Engineers, American Society of; North-East Coast Institution of Engineers and Shipbuilders; Optical Society; Patentees, Institute of; Petroleum Technologists, Institution of; Physical Society; Public Lighting Engineers and Superintendents, Institution of; Radio Society of Great Britain; Royal Society; Rubber Industry, Institution of; South Wales Institute of Engineers; Transport, Institute of; Waterworks Association, British; Welding Engineers, Institution of*
Instruments, Electrical Measuring, Commercial and Indicating (Review), 337
— — Planimeter for Averaging Charts, 207*
— — Power Factor Meter, 207*
— — Railway Dynamometer Cars, 208*
— Recording, Cambridge, British Association Meeting, 287
— Scientific, British Empire Exhibition, 129,* 278*
— See also *Aeronautics; Electric*
Insulation. See *Heat; Electric*
Insurance, Workmen's. See *Labour*
Intake Control, Water Channels, 432*
Interference Method, Testing Gauge, 129*
Interferometers, Calibration of Standard Metre, Japanese Government, 491*
— Hilger's, Testing Photographic Lenses, 6
Internal-Combustion Engines. See *Aeronautics; Engines; Motor Cars; Motor Boats; Tractors; Turbines, Gas*
— Grinder. See *Grinder* under *Machine Tools*
International Channelling Machines, Ltd., Siskol Coal Cutter, 225*
— Character of Industry, 298
— Commission, Illumination, Work of, 175
— Electrical Standards, Work of National Physical Laboratory, 6
— Electrotechnical Commission, Work, 121
— Joint Commission, Canadian Water Power, 37
— Life-Boat Conference, 16. See *Erratum*, 207
— Mathematical Congress, Toronto: Hon. Sir C. A. Parsons on the Steam Turbine, 469; Prof. Sir J. B. Henderson on Teaching Mathematics to Engineering Students, 491
— Standard, Testing Hydraulic Power Plants, 51, 145
— Trade. See *Trade*
Inventions, Exhibition of, Institute of Patentees, 236. See 801.
— See also *Patents.*
"Invermira," Motor Launch Venezuela, 800*
Inverted Process, Extrusion of Brass Rod, 387*. See 379, 415.
Ionised Elements, Spectra of, 321*
Ireland, Bann River, Bascule Bridge, 758*
— Ulster Coalfield, Development, 175
Iron Alloys. See *Metallurgy* and *Steel*
— Castings, Influence of Titanium, 113
— — Production in Cast-Iron Moulds, 377
— Corrosion. See *Corrosion*
— Effect on Copper, 379
— Electro-Deposited, Hardness of, 599
— Electrolytic, Manufacture, 117
— Foundry. See *Foundry*
— Furnaces. See *Furnaces*
— Heat Treatment. See *Metallurgy*
— Manufacture. See *Furnaces, Blast; Metallurgy*
— Sheets, Galvanised, Testing, 825*
Iron Ore. See *Ore*
— Oxygen Alloys, Constitution of, 366
— Pig, Prices. See *Metal-Price Diagrams*
— Pure, Determination of Oxygen in, 366
— Rolling Mills. See *Rolling Mills*
— Smelting, Electric, Resistance of Coke and Charcoal, 637
— and Steel, Corrosion in Sea Water, 775
— — Electric Manufacture, 117
— — Hydrogen Diffusion in, 365
— — Industry, Belgian, Statistics, 838
— — Industry, German, Present Position, 228
— — Industry, India, 509, 537
— — Industry, South Africa, 205*
— — Industry, Position of, 365
— — Industry, United States, Power Production and Use, 84

Iron and Steel Institute:

Spring Meeting, London
Hardness of Electro Deposited Iron, Nickel Cobalt and Copper, by Dr. J. MacNaughten, 599

Autumn Meeting, British Empire Exhibition
Programme, 133
Introduction, 334
Election of President and Officers, 365
Report of Discussions, 365
Present Position of the Iron and Steel Industry, by Sir W. Ellis, 365
Pickling; or the Action of Acid Solutions on Mild Steel and the Diffusion of Hydrogen through the Metal, by Prof. C. A. Edwards, 365
Effect of Free Surfaces on the Plastic Deformation of Certain Metals, by Dr. F. C. Thompson and W. E. W. Millington, 366
Iron and Oxygen, by F. S. Tritton and Dr. D. Hanson, 366
Estimation of Oxygen in Pure Iron, by T. E. Rooney, 366
Hardening of Steel, by Dr. W. Rosenhain, 391*
Improvements in the Brinell Test on Hardened Steel, Including a New Method of Producing Hard Steel Balls, by A. Hultgren, 367
Nature of High-Speed Steel, by M. A. Grossmann and E. C. Bain, 347, 393
Changes of Volume of Steels during Heat Treatment, by Dr. L. Aitchison and G. R. Woodvine, 351*

Iron and Steel Institute, American: Iron and Steel Scrap, by E. J. Lowry, 806
— — Products, British Empire Exhibition, 99*, 438*
— — Scrap, Classification of, 806
— — Works. See *Works*
— — See also PARAGRAPH INDEX
— Tests. See *Tests (Materials)*
— Welding. See *Welding*
— See also *Cast Iron; Steel; Pig Iron; Metallurgy*
Ironwork, Structural. See *Bridges; Roofs; Steelwork; Structures*
Irrigation Engineering, Principles of (Review), 631
— in India, 536
— Low-Lift Centrifugal Pump, 3*
— Sardinia, Tirso River Dam, 632*
— See also PARAGRAPH INDEX
Italian Government, Tirso Hydro-Electric Scheme, Sardinia, 632*
— Navy, Autumn Manœuvres, 806
— — Submarines, Design and Functions, 171, 232
— — Torpedo Boat Destroyers, 582
— Water Power, Auxiliary Steam Plants, 42. See 503
— — Turbines, Recent Developments, 44
Italy, Dam Construction, 44
— Electro-Metallurgy in, 117

J.

JACKS, Trewhella, for Timber Clearing, 383
Jacquard Looms, Cotton Weaving, 249*
Jaffa, Investigations of Horizontal Tacheometry, 505*
Jaguar Aero Engine, 870*
Janney Variable Speed Gear for Winches, 211*
Japan, Power Resources, 33. See 19
Japanese Government, Interferometers for Calibration of Standard Metre, 491*
— Ships, Load-Line Regulations, 113
— Society of Mechanical Engineers. See *Mechanical Engineers*
— Train-Ferry Steamer "Shoho Maru," 735*
Jasper, Prof. T. McL., on Quenching Stresses in Steel, 285, 343*. See LETTER, 641; on Evidence for Fatigue Limits, 580*, 658*. See 284
Jeans, Dr. J. H., on Loss of Mass by Radiation, 802
Jefferson, C. J., on Fuel Conservation, United States Shipping Board Vessels, 714
Jenkin, Prof. C. F., on the Work of the Fatigue Panel, Aeronautical Research Committee, 245. See 284
Jennings, G. L., on Gas Lighting, British Empire Exhibition, 259
Jersey Railways, Steam Motor Coach, 6*. See *Errata*, 133
Jet Dispersers for Water Discharge, 247*
Jewellers' Bench Drill, Extra High-Speed, 406*
Johnson, A. R., Penang Hills Railway, 664*, 726*, 789*, 852*
Johnson & Phillips, Ltd., Cable-Handling Machinery, S.S. "Edouard Suenson," 269*. See 196*
Johnson Valves, Queenston-Chippawa Hydro-Electric Development, 256*
Jones, H. C., on Fire Engine Construction, 672
Jones and Shipman, A. A., Ltd., Drilling Machines, 314*; Grinding Machines, 318; Sundstrand Stub Lathe, 357*; Jewellers' High-Speed Bench Drill, 406*
Journals. See *Bearings*
Junior Institution of Engineers: H. C. Jones on Fire-Engine Construction, 672; H. G. Bouly on Fluid Transmission Gears, 842
Jupiter Aero Engine, Swedish Government Tests, 112; Service Performance, 542

K.

KAPLAN Hydraulic Turbine, 63, 183*
Karrier Motor Company, Ltd., 3-ton Lorry, 372
Kearns, H. W., & Co., Ltd., Horizontal Surfacing, Boring, Drilling and Tapping Machine, 314*; Horizontal Boring, Milling and Facing Machine, 699*
Kelvin, Bottomley & Baird, Ltd., Mercury-Vapour Lamp, 295*
Kelvin Centenary Celebrations, 97. See 104
Kelvin, Lord, and the Progress of Electrical Engineering, 194. See 266
Kelvin Medal, Award to Prof. Elihu Thomson, 97. See 104
Kemnal, Sir J., on Tendencies in Steam Generation, 588. See 41
Kendall & Gent (1920), Ltd., Plano-Milling Machines, 318*; Vertical Milling Machine, 398*; Screwing Machine, 444*; Horizontal Boring, Drilling and Tapping Machine, 878*
Kennington to Charing Cross Extension, Underground Railways, 328
Kent, G., Ltd., Compressed Air Flow Meters, 193*; Balanced Manometer, 223*
Kernel Separating Plant, Palm Nuts, 513*
Keys and Keyways, Standard Dimensions, 878
— Seating Machine. See *Machine Tools*
— Token Instrument, Railway Signalling, 10*
Kinematography, Industrial, Mercury-Vapour Lamp, 295*
King's Road Power Station, St. Pancras, Extensions and Efficiency, 642*
Kitchen Car, Electrically Equipped, London and North Eastern Railway, 480*
Kloumann, S., on Export of Electrical Power from Norway, 213. See 78
Kneidl, Dr. J., on the Kaplan Turbine, 183*
Koch, Dr. L., Survey of North West-Greenland, 344
Konus Kemik Chemical Fire Extinguisher, 530
Korting Oil-Fuel System, Cable Steamer "Edouard Suenson," 197*
Kristiania, Electric Power Supply, 85

L.

LA VOULTE VIADUCT, Repairs to, 557
Laboratory, Chemical Engineering, University College, London, 682
— High-Tension Electric, National Physical Laboratory, 6; Henley's Cable Works, 736*
— Research, Birmingham Gas Department, Industrial Kinematography, 295*
— — Henley's Cable Works, 736*
— See also *National Physical*

Labour:

Accumulator Factories, Lead Poisoning, Home Office Regulations, 753
Class Warfare, Futility of, 681. See LETTER, 746
Colliery Industry, Labour Situation, Need for Co-operation, 585
— — Miners' Wages and Cost of Coal, 521. See 518*
— — Proposed Control, Report, 293
Engineering Industries, British and German, Hours and Wages in, 757
Factory Accidents. See *Accidents*
Hours of Labour, British and German Engineering Industries, 757
— — and Human Happiness, 648
Industrial Accidents. See *Accidents*
— Concerns, Workmen Directors, 586
— Decentralisation and Electric Power Supply, 185
— Disputes, Means for Avoiding, 585
— Economics, Reduction of Manufacturing Costs, 419
— — and Scientific Methods, 865
— Fatigue Research, Application of Results, 202
— — Research, Statistical Investigation of Factory Accidents, 709. See 701, 746, 810
— Notes. See *Labour Notes* (below)
— Welfare. See *Welfare* (below)
Industry, Foreign Trade and International Competition, 298
— Labour Situation, Need for Co-operation, 585
International Character of Industry, 298
— Insurance, Unemployment. See *Unemployment* (below)
Labour Costs, Manufacturing Work, Apportionment, 583. See 433
— Notes, 24, 61, 103, 141, 176, 195, 237, 270, 299, 327, 380, 422, 452, 495, 527, 557, 591, 621, 643, 685, 715, 748, 778, 811, 839, 869. See PARAGRAPH INDEX
— Party, Summer School, W. L. Hichens on Industrial Problems, 298
— Skilled and Unskilled, Relativity in Wages, 489
Lead Poisoning, Accumulator Factories, Home Office Regulations, 753
Lock-outs and Strikes, Avoiding, 585
Miners, Coal, Health of, 294
— Wages and Cost of Coal, 521. See 518*
Power Presses, Safety Precautions, 18
— Production, Social Aspect, 36, 37
Railways, British, Labour Statistics, 524
Shipbuilding Industry, Wages in, 265
— Work, Prevention of Accidents, 333
Social Reactions of Cheap Power, 185
Socialism and Class Warfare, 681. See LETTER, 746
Strikes and Lockouts, Avoiding, 585
— and Unemployment Insurance, 332
Trade Unions, Relativity in Wages, 489
— — Restrictions, Demarcation of Work, 586

Labour—*continued.*
Unemployment Insurance and Trade Disputes, 332
— Is it Inevitable? (Review), 555
— and Overseas Investments, 617
— and Restriction of Output, 586
Wages, British and German Engineering Industries, 757
— — Railwaymen's, 524
— Miners' and Cost of Coal, 518* 521.
— Rates and Production Costs, 419
— in Shipbuilding Industry, 265
— Skilled and Unskilled Workers, Relativity, 489
Wealth, Distribution of, 681. See LETTER, 746
Welfare Schemes, Experience with, 237
Workers, Health of, 294
Working Hours, British and German Engineering Industries, 757
— — and Human Happiness, 648
Workmen Directors, Industrial Concerns, 586
— Compensation Case, Disobedience to Regulations, 172
Ladder Bridge, Mount Everest Expedition, McGruer Spar Construction, 304*
Lagging Materials. See *Heat Insulation*
Lake Cargo Steamers with Unloading Conveyors, 723*. See *Erratum*, 863
Lakeside Power Station, Pulverised Fuel, Handling Tests, 592
Lamb, Lieut.-Col. H. S., on Engineering Problems and Traffic on Great Lakes, 266
Lamda-Lancia Motor Car, 575*
Lamme, B. G., on American Power Station Electrical Equipment, 108
Lamme, B. G., the Late, 94
Lamps, Electric. See *Electric*
— Mercury-Vapour, Kinematography, 295*
— Motor-Car Lighting Equipment, 260
— Oil, Long-Burning, for Railway Signalling, 9
— Safety, for Miners, Caeg Electric, 529
Lancashire Boiler. See *Boiler*
— Coal, Arley Seam, Fuel Research Board Investigations, 552
— Electric Drive, Planing Machines, 362*
Lanchester Motor Cars, 606*
Lanchester-Prandtl Theory, Aviation, and the Flettner Rotor Ship, 710, 770. See LETTER, 831*
Lancia Motor Car, 575*
Land Reclamation and Dredging, 437. See *Erratum*, 486
Lang, J., & Sons, Ltd., Lathe, 309*
Langdon-Davies, W., the Late, 862
Langlands, S. B., on Street Lighting in Glasgow, 458
Lapointe Co., J. N., Broaching Machine, 442*
Latex, Rubber, Industrial Applications, 776
Latham, E., on Dredging and Land Reclamation, 437. See *Erratum*, 486
Lathes. See *Machine Tools*
Launch, Orient Liner "Oronsay," 265
— M.S. "Moveria," Donaldson Line, 548
— Motor. See *Motor Boat*
— Seasled Type, Motor-Propelled, 460*
Laundry, Washing Machines, Canadian, 140*
Laval Geared Turbine Machinery, S.S. "Drottningholm," 841*
— Watson Testing Apparatus, Insulating Oils, 977*
Law. See *Legal; Labour; Patents*
Lawaczeck Hydraulic Turbines, 434*, 851*. See 63
Lea-Francis Motor Car, 610*
Lea, Professor F. C., on the Effect of High Temperature on the Range of Repetition Stresses, 500, 532*. See 284; on the Effect of Low and High Temperatures on Materials, 816*, 843*. See 793
Lea, R. S., on Development of the St. Lawrence, 239*, 271*. See 267
Lea Recorder Co., Ltd., Coal and Water Measuring Apparatus, 598*
Lead Alloys. See *Alloys* under *Metallurgy*
— Poisoning, Accumulator Factories, Home Office Regulations, 753
— Prices. See *Metal-Price Diagrams*
Leeds Forge Co., Ltd., Double-Bolster Bogie, 280*
— University, Jubilee Celebration, 839
Lees, Asa & Co., Ltd., Cotton Machinery, British Empire Exhibition, 90*
Lees-Bradner Co., Gear-Tooth Grinding Machines, 402*
Legal:
Factory Bill and Boiler Explosions, 334
Labour Legislation. See *Labour*
Patent Law. See *Patents*
Power Plants, French Legislation, 37
Workmen's Compensation. See *Labour*
See also PARAGRAPH INDEX
Legislation. See *Legal; Labour; Patents*
Leicester Show, Royal Agricultural Society, 20*, 59*
Length Standard, Design of, 128*
— — Interferometers for Calibrating, Japanese Government, 491*
Lenses, Fused Silica, Ultra-Violet Light, 296
— Photographic, Hilger's Interferometer for Testing, 6
Lessells, J. M., on the Elastic Limit and Fatigue Breakdown, 813*. See 793
Letters to the Editor, 14, 101, 142, 166, 198,* 334, 424, 462, 486*, 548, 582, 641, 676, 704, 746, 769*, 810, 831*, 861. See LETTERS INDEX
Level, Sensitive, Comparing End Gauges, 129*
Ley, C. H., on Horizontal Tacheometry, 505*
Leyland Motors, Ltd., Motor Fire Engine, British Empire Exhibition, 156*
Life-Boat Conference, International, 16. See *Erratum*, 207
— — Motor, British and Foreign, 16. See *Erratum*, 207
— — Royal National Institution, Centenary, 16. See *Erratum*, 207
— Saving Appliances, Merchant Shipping, Regulations, 587
Lifting Bridges. See *Bridges*
Light Aeroplanes. See *Aeroplanes* under *Aeronautics*
Light Alloys. See *Alloys* under *Metallurgy*
— Polarised, Stress Determination by. See *Optical*
— Radiation and Loss of Mass of Stars, 802
— Refractive Index and Crystal Structure, 368
— Scattering of, 367
— Standard, Proposed International, 175
— Theory of Diffraction, 548
— — of, Work of Lord Kelvin, 98. See 104
— Ultra-Violet, Fused Silica Lenses, 296
— Velocity of, Recent Measurements, 738
— Wave Length of, Calibration of Standard Metre, 491*
— See also *Spectrum; Diffraction*
Lighting, Electric, Colliery Fittings, 529*
— Engineers and Superintendents, Institution of. See *Public Lighting*
— Equipment of Motor-Cars, 260
— Gas, Development of, 81
— — and Electric, British Empire Exhibition, 259
— International Commission, Work of, 175
— National and International Aspects, 77. See 175
— Progress with Electric Lamps, 77
— Road, and Motor-Car Traffic, 260. See 458
— Street, in Glasgow, 458
— Vocabulary of, 175
— See also *Lamps* under *Electric*
Lignite, Occurrence and Use, 480
Lilla Edet, Hydro-Electric Power Plant, Turbine Design, 63
Limestone Steamers, with Unloading Conveyors, Great Lakes, 723*. See *Erratum*, 863
Limit Gauges. See *Gauges; Gauging*
Liners, Piston-Valve, Milling Ports, 354*
Liquefaction of Gases, Research Work, Toronto University, 367
Liquid Fuel. See *Oil Fuel*. See also *Alcohol; Motor; Paraffin; Petrol*
— Meter, Bassler, with Temperature Compensator, 497*
Lister, G., Filter Press, Transformer Oil, 768*
Literature, 189, 336, 524, 555, 589, 618, 631, 663, 714, 809. See LITERATURE INDEX
Lithuanian Trade and Industries, Report, 268
Litigation. See *Legal; Labour; Patents*
Little Belt, Proposed Railway Bridge, 292
Liverpool Engineering Society, Presidential Address by R. E. Gibson, on Gas Supply in Liverpool, 682
— Gas Supply in, 682
— Gladstone Docks, Construction, 47*
— Proposed Tunnel under Mersey, 461
Ljungström Steam Turbine: Comparisons with Erste-Brunner Turbine, 142; Manufacture, 699*
— Turbo-Generators, British Empire Exhibition, 71*; St. Pancras Power Station, 642*
Lloyd's Register, Annual Report, 656
— — Book, Merchant Shipping, 166
— Statistics, Shipping Losses, 267, 519, 820
— — Vessels under Construction, 52, 516
— — World's Merchant Shipping, 98
Load-Line Regulations, Japanese Ships, 113
Loading Colliery Tubs, Gate-End Conveyor, 227*
Local Authorities. See *Municipal*
Locks and Weirs, River Seine Regulation Works, 682*
— Entrance, Gladstone Dock, Liverpool, 47*
Lock-outs. See *Labour*
Locomotives, Compressed Air, Compressor for Charging, 498*
— Draughtsman, Salary and Status, 765
— Electric Battery, for Colliery Work, 252*
— — 0-4-4-0 Type, for Montreal Docks, 746
— — and Steam, Working Costs, 456
— Engineers, Institution of, Lieut.-Col. E. O'Brien on Railway Electrification, 456
— Feed-Water Heater and Pump, Worthington-Simpson, 478*
— Geared Turbine, the Reid-MacLeod, 479*
— Mechanical Lubricator for, 163*
— Oil-Engine, Shunting (Swiss Locomotive and Machine Works), 701*
— — Engine, Shunting, with Electric Transmission, 781*
— Piston Valves, Milling Ports in Liners, 354*
— 2-8-8-2 Type, Simple Mallet Articulated, Chesapeake and Ohio Railroad, 795*, 860*
— 4-8-0 Type, Three-Cylinder Superheater, Buenos Ayres Great Southern Railway (Armstrong, Whitworth & Co., Ltd.), 280*
— Road. See *Motor; Road; Tractor*
— See also *Railways* in PARAGRAPH INDEX
Lodge, Sir O., on Electrical Precipitation, 648. See LETTER, 676
London Area, Electricity Supply, 171
— — Road Improvements, 571*
— Bridges and Cross-River Traffic, 641, 647
— — Foundation Settlements, 641. See 102, 647, 676, 807
— Clay, Properties of, 640, 641, 647. See LETTER, 676
— County Council Evening Classes, 377
— Docks, Roads Improvements, 572*
— Midland & Scottish Railway, Third-Class Vestibule Carriage, 160*; Transport of Turbo-Alternator Stator, 370; Transport of Large Cupolas, 592*
— & North Eastern Railway, Double Bolster-Carriage Bogie, 280*; Electrically-Equipped Kitchen Car, 480*
— Port of, Report on, 554
— Streets, Inclined Crossings at Junctions, 641, 648
— — Traffic Congestion, Causes and Remedies, 522, 651. See 640, 647
— Transport, Work of the Engineer, 640, 647. See LETTERS, 676
— Underground Railways. See *Underground*
— University College, Chemical Engineering Laboratory, 682
— — Degrees in Engineering, 831
— Waterloo Bridge, Proposed Reconstruction, 102, 807. See 641, 647, 676
— Westminster Bridge, Stress Measurements, 296
Londonderry Power Station, Yarrow Boilers, 177*
Longitude Determination, Time Signals, 410
Looms, Cotton-Weaving, British Empire Exhibition, 247*
"Lord Combermere," Steam Tug and Water Boat, Barbados, 370*. See *Erratum*, 415
Lorries. See *Motor Wagons*
Low-Temperature Carbonisation Coal. See *Coal*
Lowry, E. J., on Iron and Steel Scrap, 806
Lubrication, Cold-Rolling Mill Bearings, 636*. See 569*, 601*, 769*
— Ilgner Flywheel, Rolling Mill Drive, 842*
— Oil-Groove Cutting Machine, 444*
— Tell-Tales, Turbine Reduction Gears, 422*
— Turbo-Generator, Turbine-Driven Oil Pump, 762*
— of Wire Ropes, 858, 868
Lubricator, Mechanical, Locomotive, 163*; Gardner Oil Engine, 597*
Lugt, G. J., on a Double-Acting Marine Diesel Engine, 26*
Lumsden Machine Co., Ltd., Grinding Machines, 318*, 443*
Lumsden, T., the Late, 229
Lundberg, H. A., on Swedish Steam Power Plants, 503
Lupton & Place, Ltd., Cotton Weaving Machinery, 248*
Luton Corporation, Stal-Ljungström Turbo-Generator, Tests, 142
Lympne Trials, Light Two-Seater Aeroplanes, 525*. See 232, 549, 652

M.

MACARTHY Cotton Gin, 11*
Macassey, Sir L., on London Traffic, 522
Mac. See also *Mc*
Machine Shops. See *Works Machine Tools*
— Testing. See *Testing Machines* and *Tests* (*Materials*)
Machine Tool and Engineering Exhibition: 297*, 309*, 353*, 397*, 441*
Automatic Machines, 399*, 442*
Boring, Drilling and Tapping Machines, Horizontal, 313*
Boring Mills and Vertical Lathes, 310*, 397*
Broaching Machines, 442*
Drilling Machines, 314*, 358*, 406*, 441*
Gear Generating and Grinding Machines, 401*
Gear Planing Machines, 363*
Grinding Machines, 318*, 401*, 443*
Hammers and Forging Machines, 407*
Lathes, 309*, 350*, 401*, 447
Milling Machines, 318*, 353*, 397*
Motor Starting and Regulating Panels, 447
Oil-Groove Cutting Machine, 444*
Planing Machines, 362*
Plano-Milling Machines, 318*
Sawing Machines, 319*, 445*
Screwing Machines, 444*
Shaping Machines, 359*
Slot-Drilling Machines, 405*
Slotting Machines, 363*
Testing Machines, 445*
Tool Steel, 447
Tube-Bending Machine, 445*
Woodworking Machines, 297*
See also *Machine Tools*
Machine Tools:
Automatic Chucking Machine (Potter & Johnston Machine Co.), 400*
— Machine, Five-Spindle (National Acme Co.), 442*
— — and Production Costs, 420
— — Vertical, for Chucking Work (T. Ryder & Sons, Ltd.), 399*
Bar-Screwing Machine (Kendall & Gent, (1920), Ltd.), 444*
Bending Machine, Tube (New Fortuna Machine Co., Ltd.), 445*
— Press, Plate, Hydraulic, Overhung Type (Rice & Co. (Leeds), Ltd.), 787*
— Tool, Electrical Wiring Conduit, 236
Bolt-Screwing Machine (Kendall & Gent (1920), Ltd.), 444*
Boring Cutter S.R. (Vickers, Ltd.), 99
— Drilling and Tapping Machine, Horizontal (Kendal and Gent (1920), Ltd.), 878*
— — Tapping and Surfacing Machine, Horizontal (H. W. Kearns & Co., Ltd.), 314*. See 699*
— Milling, Drilling, Tapping and Facing Machine, the Pearn-Richards (G. Richards & Co., Ltd.), 314
— — and Facing Machine, Horizontal (H. W. Kearns & Co., Ltd.), 699*. See 314*
— Machine, Wood, Hollow-Chisel and Multiple-Spindle Type (T. Robinson & Sons, Ltd.), 297*
— and Turning Mill, Vertical (Armstrong, Whitworth & Co., Ltd.), 699*
— — Mill, 4-ft. Vertical (G. Richards & Co., Ltd.), 397*
— — Mill, 4-ft. Vertical (Smith & Coventry, Ltd.), 398*
— — Mill, 4-ft. Vertical, the "Velomill" (J. Stirk & Sons, Ltd.), 398*
— — Mill, 100-in. Vertical, the "Hilomill" (J. Stirk & Sons, Ltd.), 313*
— — Mill, 42-in. Vertical Double-Ram (Webster & Bennett, Ltd.), 312*
Broaching Machine, Hydraulic (J. N. Lapointe Co.), 442*
Capstan Lathe, 6¼-in. Centres (W. H. Ward & Co., Ltd.), 357
Chain Mortising Machine (Wadkin & Co.), 23*
Chucking Machine, Automatic (Potter & Johnston Machine Co.), 400*
— — Vertical Automatic (T. Ryder & Sons, Ltd.), 399*
Cutter, Boring, S.R., (Vickers Ltd.), 99
— Grinding Machine, Sunderland Gear Planer (J. Parkinson & Son), 365*
Cutting Machine, Oxygen-Jet, Steel Plates (Godfrey Engineering Works), 124*
— Properties, Tool Steel, Testing Machine for (E. G. Herbert, Ltd.), 446*
Machine Tools—*continued.*
Dividing Head for Milling Machine (J. Parkinson & Son), 355*
Drilling, Boring and Tapping Machine, Horizontal (Kendall & Gent (1920), Ltd.), 878*
— — Tapping and Surfacing Machine, Horizontal (H. W. Kearns & Co., Ltd.), 314*
— Machine, All-Geared Multiple-Spindle (A. A. Jones & Shipman, Ltd.), 315*
— — 25-in. All-Geared Upright (A. A. Jones & Shipman, Ltd.), 315*
— — Bench, High-Speed, for Jewellers (A. A. Jones & Shipman, Ltd.), 406*
— — 36-in. Geared Radial (F. Pollard & Co., Ltd.), 316*, 441*
— — 12-in. High-Speed Precision (F. Pollard & Co., Ltd.), 315*
— — Multiple Spindle, for Motor-Car Axles (J. Archdale & Co., Ltd.), 359*
— — 4-ft. 6-in. Radial (J. Archdale & Co., Ltd.), 359*
— — 5-ft. 3-in. Radial (Crossley & Co.), 359*
— — 6-ft. Radial, Central-Thrust Type (W. Asquith (1920), Ltd.), 358*, 359*
— — 6-ft. 6-in. Radial, Motor-Driven (A. Herbert, Ltd.), 316*
— — 7-ft. Radial, with Tapping Spindle (W. Asquith (1920), Ltd.), 358*
— — Sensitive, Ball Bearing (F. Pollard & Co., Ltd.), 316*, 406*
— — 36-in. Sensitive Geared Radial (A. A. Jones & Shipman, Ltd.), 314*
— — Sensitive, Multiple Spindle (Smith & Coventry, Ltd.), 358*
— — 4-ft. 6-in. Sensitive Radial (J. Archdale & Co., Ltd.), 359*
— — Slot (Smith & Coventry, Ltd.), 495*
— — Three-Spindle Multiple-Unit (J. Archdale & Co., Ltd.), 359*
— — 24-in. Upright, the "Corona" (F. Pollard & Co., Ltd.), 316*
— — 24-in. Vertical (W. Asquith (1920), Ltd.), 358*
— Tapping, Facing, Boring and Milling Machine, the Pearn-Richards (G. Richards & Co., Ltd.), 314
Drills, Speedicut Steel, Tests of (T. Firth & Sons, Ltd.), 447
Drop Stamps Multiple Impression Dies (Brett's Patent Lifter Co., Ltd.), 705*
Erecting Shops, Turbine Manufacture, Brush Co.'s Works, 699*
Facing, Boring, Milling, Drilling and Tapping Machine, the Pearn-Richards (G. Richards & Co., Ltd.), 314
— Milling and Boring Machine, Horizontal (H. W. Kearns & Co., Ltd.), 699*
File-Testing Machine (T. Firth & Sons, Ltd.), 447
Fitting of Shafts and Holes, German Tolerances, 150
Forging, Drop, Stamps for Multiple-Impression Dies (Brett's Patent Lifter Co., Ltd.), 705*
— Machine, 5-Hammer, for Swaging (T. Ryder & Son, Ltd.), 407*
— — Universal (B. & S. Massey, Ltd.), 407
— and Upsetting Machine (Selson Engineering Co., Ltd.), 407*
Gauging, Fitting of Shafts and Holes, German Tolerances, 150
Gear-Cutting Attachment, Horizontal Boring Machine (H. W. Kearns & Co., Ltd.), 314*
— Planing Machine, Sunderland, Double Helical Gears (J. Parkinson & Son), 363*; Cutter Grinder for, 365*
— Tooth Grinding Machines (Fellows Gear Shaper Co.), 402*; (Lees-Bradner Co.), 402*
— Worm, Generating Machine for (Smith & Coventry, Ltd.), 401*
— — Hobbing Machine for (J. Holroyd & Co., Ltd.), 401*
Generating Machine, Screw Thread (Fellows Gear-Shaper Co.), 403*
Grinding Attachment, Horizontal Boring Machine (H. W. Kearns & Co., Ltd.), 314*
— Cutlery, Accidents in, 773
— Machine, Centreless (Cincinnati Milling Machine Co.), 404
— — Centreless, the Coventry (Birmingham Small Arms Tools, Ltd.), 404*
— — Cutter, Sunderland Gear Planer (J. Parkinson & Son), 365*
— — Gear-Tooth (Fellows' Gear Shaper Co.), 402*; (Lees-Bradner Co.), 402*
— — Internal (Heald Machine Co.), 404*
— — Internal, Plain and Splined Shafts (Churchill Machine Tool Co., Ltd.), 405
— — Plain and Universal (A. A. Jones & Shipman, Ltd.), 318
— — Screw Thread (Wolseley Motors, Ltd.), 547*
— — Sharpening Hack-Saw Blades (E. G. Herbert, Ltd.), 405*
— — Surface, Planetary Head (Lumsden Machine Co., Ltd.), 318*
— — Surface, Roll-Grinding Attachment for (Snow & Co., Ltd.), 403*
— — Surface, Segmental-Wheel Type (Snow & Co., Ltd.), 403*
— — Universal Tool & Cutter (A. A. Jones & Shipman, Ltd.), 318
— — Vertical Spindle (Lumsden Machine Co., Ltd.), 318*, 443*
— — Woodworking Tools (J. Holroyd & Co., Ltd.), 405*
— — Worm (J. Holroyd & Co., Ltd.), 405*
Hack-Saw Blades, Sharpening Machine for (E. G. Herbert, Ltd.), 405*
— — Blades, Testing Machine for (E. G. Herbert, Ltd.), 445*
— Sawing Machine 10-in. Rapidor (E. G. Herbert, Ltd.), 319*
— — Machine for Rolled-Steel Sections (Humpage, Thompson & Hardy), 320*

Machine Tools—*continued.*

Hack-Saw Machine, Swivelling for Girders (C. Wicksteed & Co. (1920), Ltd.), 445*
Hammers, Drop Forging, for Multiple Impression Dies (Brett's Patent Lifter Co., Ltd.), 705*
— Pneumatic Power, 3-cwt. Single-Blow (B. & S. Massey, Ltd.), 407*
— Pneumatic Stamping, 10-cwt. (B. & S. Massey, Ltd.), 407*
Hydraulic Broaching Machine (J. N. Lapointe Co.), 442*
— Press. See *Press* (below)
Key-Seating and Slot-Drilling Machine (Smith & Coventry, Ltd.), 405*
Lathe Accidents, Statistics, 773
— Belt-Pulley Turning (Ward, Haggas & Smith), 358*
— 6½-in. Capstan (H. W. Ward & Co., Ltd.), 357
— 9½-in. Centres, All-Geared (Colchester Lathe Co.), 401*
— 8½-in. Centres, All-Geared (Dean, Smith & Grace (1908), Ltd.), 401*
— 3½-in. Centres, Back-Geared, Self-Acting (Drummond Bros., Ltd.), 67*, 310*. See 447
— 9-in. Centres, Combination Turret (J. Holroyd & Co., Ltd.), 357*
— 10-in. Centres, Combination Turret (H. W. Ward & Co., Ltd.), 356*
— 7½-in. Centres, Geared Headstock (Colchester Lathe Co.), 356*
— 8½-in. Centres, Geared Headstock (Selson Engineering Co., Ltd.), 357*
— 13-in. Centres, General Purpose (C. Redman & Sons, Ltd.), 310*
— 6½-in. Centres, Relieving (Dean, Smith & Grace (1908), Ltd.), 401*
— 4½-in. Centres, Screw-Cutting (Britannia Lathe and Oil Engine Co., Ltd.), 447
— 4½-in. and 3½-in. Centres, Screw-Cutting (H. Milnes), 447
— 2-in. Centres, Screw-Cutting, for Model Makers, the Wade (C.A.V. Small Tools, Ltd.), 749*
— 6½-in. Centres, Sliding, Surfacing and Screw-Cutting (Colchester Lathe Co.), 356*
— 10½-in. Centres, Sliding, Surfacing and Screw-Cutting (J. Lang & Sons, Ltd.), 309*
— 18½-in. Centres, Sliding, Surfacing and Screw-Cutting (Selson Engineering Co., Ltd.), 310*
— 4-in. Centres, Sundstrand Stub Type (Rockford Tool Co.), 357*
— 12-in. Centres, Surfacing and Boring (Dean, Smith & Grace (1908), Ltd.), 401*
— 7-in. Centres, Tool Room, Geared Headstock (Holbrook & Sons), 356*
— 36-in. Vertical Turret (Webster & Bennett, Ltd.), 310*
— See also *Automatic* (above)
Limit Gauging. See *Gauging*
Machine Shop Management. See *Works Management*
— — Turbine Manufacture, Brush Company's Works, 699*
— Tools, Canadian Exhibits, British Empire Exhibition, 138*
— — Motor Starting and Control Panels, 447
— Work, Tolerances in. See *Gauging*
Milling, Boring and Facing Machine, Horizontal (H. W. Kearns & Co., Ltd.), 699*
— Drilling, Tapping, Facing and Boring Machine, the Pearn-Richards (G. Richards & Co., Ltd.), 314
— Machine, Dividing Head for (J. Parkinson & Son), 355*
— — Horizontal Spindle, Plain, Geared-Drive (J. Archdale & Co., Ltd.), 353*; (Crossley & Co.), 353*
— — Planer Type (Kendall & Gent (1920), Ltd.), 318*
— — for Small Work (Drummond Bros., Ltd.), 356
— — Universal (J. Parkinson & Son), 355
— — Universal, Plain and Vertical (A. Herbert, Ltd.), 356
— — Vertical (Kendall & Gent (1920), Ltd.), 398*
— — Vertical, Milling Piston-Valve Ports (J. Archdale & Co., Ltd.), 354*
Mortising Machine, Chain and Hollow Chisel (Wadkin & Co.), 23*
— — Hollow-Chisel and Multiple-Spindle Type (T. Robinson & Sons, Ltd.), 297*
Oil-Grooove Cutting Machine (J. Holroyd & Co., Ltd.), 444*
Pipe-Bending Machine (New Fortuna Machine Co., Ltd.), 445*
— Screwing Machine (Kendall & Gent (1920), Ltd.), 444*
Planing Machine, Bateman High-Speed (Ward, Haggas & Smith), 362*
— — Drive (T. Shanks & Co., Ltd.), 363
— — Electric Drive, Split-Field System (J. Stirk & Sons, Ltd.), 362*
— — 13-ft., Four-Speed, Belt-Driven (C. Redman & Sons, Ltd.), 687*
— — Gear. See *Gear* (above)
— — 100-in. Hiloplane (J. Stirk & Sons, Ltd.), 362*
— — 16-ft. Bed, Lancashire Electric Drive (Butler Machine Tool Co., Ltd.), 362*
— — 16-ft., Motor-Driven, Points and Crossings (C. Redman & Sons, Ltd.), 688*
— — Open Sided (Ward, Haggas & Smith), 362
— — Portable, for Anvil Blocks (B. & S. Massey, Ltd.), 407
— — Side, Chain-Drive for Tool Carriage (G. Richards & Co., Ltd.), 770*
— — the Veloplane (J. Stirk & Sons, Ltd.), 362
Plano-Milling Machines (Kendall & Gent (1920), Ltd.), 318*
Plate-Bending Press, Hydraulic, Overhung Type (Rice & Co. (Leeds), Ltd.), 787*

Machine Tools—*continued.*

Pneumatic Hammers. See *Hammers* (above)
Press, Hydraulic, Brass-Rod Extrusion, Inverted Process (H. Berry & Co.), 387*. See 379, 415
— — Plate-Bending, Overhung Type (Rice & Co. (Leeds), Ltd.), 787*
— Power, Accidents and Safety Precautions, 18, 773
Puncher Type Slotting Machine (Butler Machine Tool Co., Ltd.), 363*
Relieving Lathe. See *Lathe* (above)
Roll-Grinding Attachment, Surface-Grinding Machine (Snow & Co., Ltd.), 404*
Sandpapering Machine, Disc and Vertical Spindle (Wadkin & Co.), 23*
Saw Blades, Testing Machine for (E. G. Herbert, Ltd.), 445*
— Metal-Cutting, Tooth-Sharpening Machine (E. G. Herbert, Ltd.), 405*
— See also *Hack-Sawing Machines* (above)
Screw-Thread Generating Machine (Fellows Gear-Shaper Co.), 403*
— — Grinding Machine (Wolseley Motors, Ltd.), 547*
Screwing Machine, Pipe and Bar (Kendall & Gent (1920), Ltd.), 444*
Shaping Machine, 22-in. Crank Type (Butler Machine Tool Co., Ltd.), 361*
— — 26-in. Double Traversing-Head Type (Butler Machine Tool Co., Ltd.), 360*
— — 30-in. Double-Geared (Selson Engineering Co., Ltd.), 359*
Side-Planing Machine, Chain Drive for Tool Carriage (G. Richards & Co., Ltd.), 770*
Slot-Drilling and Key-Seating Machine (Smith & Coventry, Ltd.), 405*
Slotting Machine, 14-in. (Butler Machine Tool Co., Ltd.), 363*
— — 10-in. Puncher Type (Butler Machine Tool Co., Ltd.), 363*
Stamping Presses, Accidents and Safety Precautions, 18, 773
Stamps, Drop, Multiple-Impression Dies (Brett's Patent Lifter Co., Ltd.), 705*
Steel, Tool, Testing Machine for (E. G. Herbert, Ltd.), 446*
Surfacing, Boring, Drilling and Tapping Machine, Horizontal (H. W. Kearns & Co., Ltd.), 314*
— and Boring Lathe, 12-in. Centres (Dean, Smith & Grace (1908), Ltd.), 401*
Swaging Machine, 5-Hammer (T. Ryder & Son, Ltd.), 407*
Tapping, Drilling and Boring Machine, Horizontal (Kendall & Gent (1920), Ltd.), 878*
— — Boring and Surfacing Machine, Horizontal (H. W. Kearns & Co., Ltd.), 314*
— — Facing, Boring and Milling Machine, the Pearn-Richard (G. Richards & Co., Ltd.), 314
Tenoning Machine, Sash and Door Work (T. Robinson & Sons, Ltd.), 298*
Testing Machine, Files (T. Firth & Sons, Ltd.), 447
— — Hack-Saw Blades (E. G. Herbert, Ltd.), 445*
— — Tool Steel (E. G. Herbert, Ltd.), 446*
Threads, Screw, Generating Machine (Fellows Gear-Shaper Co.), 403*
— — Grinding Machine for (Wolseley Motors, Ltd.), 547*
Tolerances, German, Fitting of Shafts and Holes, 150
Tool-Room Lathe. See *Lathe* (above)
— Steel, Testing Machine for (E. G. Herbert, Ltd.), 446*
Tube-Bending Machine (New Fortuna Machine Co., Ltd.), 445*
Turning and Boring Mills. See *Boring* (above)
— Machines, Automatic. See *Automatic* (above)
Turret Lathes. See *Lathes* (above)
Woodworking Machinery, Mortising Machine, Chain and Hollow-Chisel (Wadkin & Co.), 23*
— — Mortising Machine, Hollow-Chisel and Multiple-Spindle Type (T. Robinson & Sons, Ltd.), 297*
— — Sandpapering Machine, Disc and Vertical Spindle (Wadkin & Co.), 23*
— — Tenoning Machine, Sash and Door Work (T. Robinson & Sons, Ltd.), 298*
— Tools, Grinding Machine for (J. Holroyd & Co., Ltd.), 405*
Worm Gear Generator (Smith & Coventry, Ltd.), 401*
— Grinding Machine (J. Holroyd & Co., Ltd.), 405*
— Wheel Hobbing Machine (J. Holroyd & Co., Ltd.), 401*
See also PARAGRAPH INDEX
Machine Work. See *Machine Tools*
Machinery Failures, Report on, 417. See LETTERS, 486, 548
Maclaurin Low-Temperature Carbonisation Plant, Dalmarnock Gasworks, 491, 682
MacMorland, Capt. E. E., on Industrial Organisation for Munitions Supply, 201
MacNaughtan, D. J., on Hardness of Electro Deposited Metals, 599
Macquisten, F. A., on Cheap Power, 185
Magaldi, G., on Protection of Naval Aeroplanes, 418
Magnesium Alloys. See *Alloys* under *Metallurgy*
Magnetism, Terrestrial, and Solar Activity, 410
Magneto Generator, Air-Turbine Driven, for Colliery Lamp, 530*
— — Electrical Speed Recorder, 208*
— Magnets, Cobalt Steel, 274*, 302*. See 286
— Standardisation of, 14
Magnets, Permanent, Cobalt Steel for, 274*, 302*. See 286
Mail Services, Aerial. See *Aeronautics*
Main and Tail Haulage Gear. See *Haulage*
Mains, Electric. See *Cables* under *Electric*
— Water, Cleaning, Victaulic Pipe Joints, 14
Mains, Water, Self-Closing Valves for, 143*
Maintenance, Commercial Motor Vehicles, 712
Malay States, Penang Hills, Railway, 664*, 726*, 789*, 852
"Malaya," H.M.S., Model, British Empire Exhibition, 187
Mallet Simple Locomotive, Chesapeake and Ohio Railroad, 795*, 860*
Management Enginering (Review), 664
— Industrial, Labour's Share in. See *Labour*
— of Works. See *Works Management*
Manchester Association of Engineers, W. E. W. Millington and Prof. F. C. Thompson, on the Inner Structure of Metals, 715
— Steam Users' Association, Criticism of New Factory Bill, 334
— Stuart Street Power Station, Turbo Generator Tests, 668
Manganese Steel, Heat Treatment of, 411
Manlove, Alliott & Co., Ltd., Palm-Oil Extracting Plant, 513*
Manometer, Balanced, Gas-Flow Measurements, 223*
Manufacturing Costs, Reduction of, 419
— Industries, British, and Foreign Competition, 298
— Resources, Organisation for Munitions Supply, 201
— Work, Apportionment of Labour Costs, 582. See 433
Manure, Artificial, See *Nitrogen*
Mapping of North-West Greenland, Danish Expedition, 344
Marconi, Senator G., on Short-Wave Radio Communication, 17, 836
— Wireless-Beacon Station, Nash Point, 582
Marconi's Wireless Telegraph Co., Ltd., Manufacture of Thermionic Valves, 456; Rectifying Valves and Water-Cooled Valves, 492*
Marcus Screens, British Empire Exhibition Colliery, 340*
Marine Auxiliary Machinery, Air Compressor (G. & J. Weir, Ltd.), 425*
— — Machinery, Electric Winches, Austin Constant-Current System, 734*
— — Machinery, Electrically-Driven, 121
— — Machinery Emergency Bilge Pump, Gwynnes, 2*; Drysdale, 217*
— — Machinery, Merryweather's Fire and Salvage Pumps, 531*
— — Machinery, Refrigerating Plant, 562*
— — Machinery, S.S. "Orama," 543*, 604*. See 643
— — Machinery, Treatise on (Review), 336
— — Machinery, Vickers' Air Pump, 573*
— Boilers. See *Boilers*
— Engineering, French Navy, Committee, 524
— — Treatise on (Review), 336
— — Works. See *Works*
— Engineers, Institute of, Sir J. Kemnal on Tendencies in Steam Generation, 588. See 41; Marine Oil Engine Trials Committee, First Report, 750*, 784*. See 730, 798
— — and Naval Architects, American Society of. See *Naval Architects*
— Engines. See *Engines; Turbines; Marine Propulsion.*
— Propulsion, Cost of Speed, 119
— — Development of Machinery, Hawksley Lecture, 669
— — Diesel-Electric System, 120, 713, 714
— — Diesel Engines, Beardmore-Tosi, 88; Trials of M.S. "Silurian," 643; Trials of M.S. "Sycamore," 730, 750*, 784*, 798
— — Diesel Engines, Bearing Pressures, 29*
— — Diesel Engines, Development, Position and Prospects, 25, 119, 120, 148, 265, 656, 668
— — Diesel Engines, Double-Acting, Test Valve for Piston Leakage, 29*
— — Diesel Engines, Duplex Pump for Piston Cooling, 5*
— — Diesel Engines, Exhaust Temperature and Composition, 730, 751*. See 799
— — Diesel Engines, Fuel Injection, Arschaouloff System, 29*
— — Diesel Engines, Fuel Oils for, 836
— — Diesel Engines with Hydraulic Clutches and Reduction Gearing, M.S. "Vulcan," 92*, 369*
— — Diesel Engines, M.S. "Cubore," Trials and Working Results, 714
— — Diesel Engines, M.S. "Silurian," Trials, 643
— — Diesel Engine, North-Eastern Werkspoor Double-Acting, 26*
— — Diesel Engines, Palmer Camellaird-Fullagar Type, Piston Withdrawal, 145*; Trials of M.S. "British Aviator," 236, 369
— — Diesel Engines, Report on Trials, 730, 750*, 784*, 798
— — Diesel Engines, Richardson-Westgarth Beardmore-Tosi, M.S. "Sycamore," Report on Trials, 730, 750*, 784*, 798
— — Diesel Engines, Swedish Developments, 148. See 120
— — Diesel Engines, Torque Measurements, 731. See 785
— — Diesel Engine, Two-Cycle Double-Acting, Worthington, 482*
— — Diesel Engines, Two-stroke and Four-Stroke Cycles, 120
— — Diesel Engines, Weights of, 730, 750
— — Electric Transmission Systems, 25, 120, 713, 714
— — Fuel Supply for, 119, 265
— — Geared Diesel Engines, with Hydraulic Clutches, M.S. "Vulcan," 92*, 369*
— — Geared Turbines, Double-Reduction Gear Wheel (Vickers, Ltd.), 100*
— — Geared Turbines, Lubrication Tell-Tales, 422*
— — Geared Turbine Machinery, S.S. "Drottningholm," 841*
— — Geared Turbines, Progress, 25, 469, 669
— — Geared Turbines, Single Reduction, S.S. "Orama," 601*. See 543*, 643
— — Geared Turbines, United States Practice, 120
— — Geared Turbines Wiberg Reversing Clutch, 120, 144*
Marine Propulsion, Hull Resistance and Power for Propulsion, 119
— — Oil Engine, 96 h.p. Two-Cycle, Gardner, 595*
— — Oil Engined Tugs, Egyptian Government, 517*
— — Oil Fuel for. See *Oil Fuel*
— — Paddle Steamers, Conversion to Stern Wheelers, 463*
— — Power for Sea Transport, 118
— — Progress and Possibilities, 25
— — Propellers, Cavitation Investigations, United States Warships, 717*. See LETTER, 769
— — Propellers, Comparisons of Model Experiments, 713
— — Propelling Machinery, Merchant Ships: Dutch, 119; Swedish, 148. See 120
— — Shallow-Draught Steamers, Yarrow Flap System, 459. See LETTER, 486
— — Steam Engines, Present Position, 669
— — Steam Engine, Triple-Expansion, Cable Steamer "Edouard Suenson," 196*
— — Still Engine, Advantages, 84
— — Thrust Measuring Gear, Michell Hydraulic, 785*
— — Treatise on (Review), 336
— — Tugs, Comparisons of Steam and Oil Engines, 517
— — Turbines, S.S. "Mauretania," Repair Work, 424*
— — Turbines, Steam, Progress, 469
— — Use of Superheat, 669
— — Weights of Machinery, 670
— — Yarrow Boilers for Warships, 458*
— — See also *Engines; Turbines; Propellers; Ship Resistance; Torsion Meters;* and PARAGRAPH INDEX
— Turbines. See *Turbines; Marine Propulsion.*
— Salvage See *Salvage*
— Structures, Deterioration and Preservation (Review), 589
— — Deterioration of, Report, 774
Markets. See *Trade* and PARAGRAPH INDEX
Markham & Co., Ltd., Haulage Gear, 251*
"Marksman," H.M. Flotilla Leader, 421
Marshall, Sons & Co., Ltd., Road Rollers, 60; Traction Engine, 810*
Martin, H. W. S., Air Washers and Filters, 780
Martin's Cultivator Co., Ltd., Trailer Fire Pump, 428*
Marylebone Power Station, Transport of Turbo-Alternator Stator, 552
Mass, Celestial Bodies Loss by Radiation, 802
Massey, B. & S., Ltd., Pneumatic Hammers, Stamps, &c., 407*
Materials, Strength of. See *Stress; Tests (Materials)*
Mathematical Congress, International, Toronto, Hon. Sir C. A. Parsons, on the Steam Turbine, 469; Prof. Sir J. B. Henderson on Teaching Mathematics, 491
Mathematics, Harmonic Analysing Instruments, 651, 876*
— Statistical Investigation, Workshop Accidents, 709. See 701, 746, 810
— Teaching to Engineering Students, 491
— Vector Quantities and Dimensional Notation, 686
— Work of Lord Kelvin, 97. See 104
"Mauretania," S.S., Record Atlantic Voyages, 424; Repairs to Turbines, 424*
Mavor & Coulson, Ltd., Portable Air Compressor, 191*; Switchgear, British Empire Exhibition Colliery, 224*; Coal-Cutting Machines, 225*; Conveyors for Colliery Workings, 226*; Gate-End Loading Conveyor, 227*; Electric Putter, 252*; Exhibits, Cardiff Engineering Exhibition, 766
May, R., Report on Corrosion Research, 378
McClintic Marshall Products Co., Ltd., Sydney Harbour Bridge, 129*. See 169, 198*
McGregor, T., the Late, 780
McGruer Hollow Spar Co., Ltd., Ladder Bridge, Mount Everest Expedition, 304*
McKay (Proprietary), Ltd., Harvester, 383
McLean, W., the Late, 707
Mc. See also *Mac*
Measuring Apparatus, Coal, Boiler Furnaces (E. Allen & Co., Ltd.), 242*; (Lea Recorder Co., Ltd.), 598*
— Appliances, Gear Teeth, 696*, 821*
— Instruments, Electrical, Commercial and Indicating (Review), 337
— Machine for Block Gauges, 129*
— — for Cloth, 250*
— Pump, Petrol, Canadian, 141*
— Telescopes, Fractional Reading Graticule for, 101*
— Vessels, Glass, National Physical Laboratory Tests, 378
Mechanical Crystallisation, Salts and Sugar, 738
— Engineers, American Society of, The Role of the Engineer in Industrial Mobilisation Planning, by Capt. E. R. MacMorland, 201

Mechanical Engineers, Institution of:

Standard Test Code for Hydraulic Power Plants, Discussion, 51
Kelvin Centenary, 97. See 104
Annual Dinner, 867

London Meetings, Winter Session.

Missing Pressure in Gas Engines, by Prof. W. T. David, 605, 623*, 679, 684. See LETTERS, 641, 704, 746
Heat Loss in Gas Engines, by Prof. W. T. David, 605, 629*, 679, 684. See LETTERS, 641, 704, 746
Thomas Hawksley Lecture on the Development of Marine Propelling Machinery, by Engineer Vice-Admiral Sir G. Goodwin, 669
Marine Oil Engine Trials Committee, First Report, 750*, 784*. See 730, 798
Elastic Limit in Tension and its Influence on the Breakdown by Fatigue, by J. M. Lessells, 813*. See 793
Effect of Low and High Temperatures on Materials, by Prof. F. C. Lea, 816*, 843*. See 793
Second Report, Wire Ropes Research Committee, by Dr. W. A. Scoble, 856*. See 867

Mechanical Engineers, Institution of— *continued.*
North Western Branch.
Steam Extraction Turbines, by W. S. Burge and J. P. Chittenden, 744
Missing Pressure and Heat Loss in Gas Engines by Prof. W. T. David, Discussion, 684. See also *London Meetings* (above)
Marine Oil Engine Trials Committee First Report, Discussion, 798. See also *London Meetings* (above)
Mechanical Engineers, Japanese Society of, New Harmonic Analyser, by K. Noguchi, 876*. See 651
— Flight. See *Aeronautics*
— Lubricator. See *Lubricator*
— Stoker. See *Stoker.*
— Traction on Roads. See *Roads; Motor-Cars; Tractors*
Medical Science and Disease Prevention, 265
Mediterranean Sea Communications, Italian Naval Manœuvres, 806
Melbourne Electric Supply, Excavating Machine for Morwell Brown Coal, 299*
Melby Dam, Sweden, Design, 76
Melovich, Prof. A., on Draft Tubes for Water Turbines, 153*
Merchant Shipbuilding. See *Shipbuilding*
— Ships. See *Ships; Steamers*
Mercury Atoms, Orbital Transfers of Electrons, 367
— Prices. See *Metal-Price Diagrams*
— Vapour Lamp, Kinematography, 295*
— — Pump, High Vacua, 267*
— — Rectifier Substations, 782*, 845*
— — Turbine, Power Production, 42
Merryweather & Sons, Ltd., Motor Fire Engine, 156*; Trailer Fire Pump, 426*; Fire Appliances, British Empire Exhibition, 530*; Portable Steam-Driven Air Compressor, 753*
Mersey Docks and Harbour Board, Gladstone Dock, 47*
— River, Proposed Tunnel under, 461
Merz & McLellan, North Tees Power Station, 57*
Metallic Crystals, Surface Phenomena, 368
Metalliferous Ores, Formation of, 588
Metallisation, Schoop Spraying Process, 409
Metallographic Microscopes, High Power and Workshop, 514*
Metallography, Vertical Illuminator for Microscopes, 30*
— See also *Metals; Metallurgy; Microphotographs*
Metallurgical Department, National Physical Laboratory, Work of, 5
— Exhibits, British Empire Exhibition, 99*, 335, 438*
— and Mining Congress, Empire. See *Empire*

Metallurgy:
Alloys, Aluminium-Bronze, Properties and Uses, United States, 376
— — (Duralumin), British Empire Exhibition, 335
— — Heat Treatment of, 391*
— — for Motor-Car Engines, 455
— Bearing Metals, Cold Rolling Mills, 601
— Copper, British Empire Exhibition, 335
— — Tensile Strength, Temperature and Cold Work, Relationship, 408
— — See also *Brass; Bronze; Gunmetal*
— Ferrous, Research Committee, 366
— Iron-Oxygen, Constitution of, 366
— Nickel-Copper (Monel Metal), Properties and Uses, United States, 376
— — Properties and Uses, United States, 376
— Non-Ferrous, Use in United States, 376
Aluminium, Purification of, 6
Blast Furnaces. See *Furnaces*
Brass. See *Brass*
Bronze. See *Bronze*
Cast-Iron. See *Cast-Iron*
Coke Ovens. See *Coke Ovens*
Corrosion of Metals. See *Corrosion*
Electro-Metallurgical Industries and Canadian Water Power, 449
Electro-Metallurgy, Italy, Sweden and United States, 117
Electrolytic Iron Manufacture, 117
Extruded Metal, British Empire Exhibition, 335
Extrusion, Brass Rod, Inverted Process, 387*. See 379, 415.
Ferrous Alloys, Research Committee, 366
Foundry. See *Foundry; Moulding*
Furnaces, Electric. See *Furnaces*
— Metallurgical. See *Furnaces*
Gold Mining and Extraction, South Africa, 204*. See 174
Heat Treatment, Aluminium Alloys, 391*
— — Bronze, Effects of, 409, 430*
— — Cobalt Steel for Magnets, 302
— — Electrical Method, Hardening End Gauges, 128*
— — Hardening of High Speed Steel, 394, See 347
— — Hardening of Steel, Theory of, 391*
— — Manganese Steel, 41*
— — Nickel Steel, Influence of Mass, 5
— — Steel, Calculation of Quenching Stresses, 285, 343*. See LETTER, 641
— — Steel, Volume Changes, 351*
Iron, Electrolytic, Manufacture, 117
— Manufacture, Early, Osmunds, 486*
— — See also *Furnaces, Blast*
— Ore. See *Ore*
— Smelting, Electric, Resistance of Coke and Charcoal, 637
— and Steel, Electric Manufacture, 117
Metallisation, Spraying Process, 409
Metallurgical Department, National Physical Laboratory, Work of, 5
— Exhibits, British Empire Exhibition, 99*, 335, 438*
Metallurgy and Electrical Engineering Progress, 57
Metals, Non-Ferrous, British Empire Exhibition, 335
— — Properties and Uses, United States, 376

Metallurgy—*continued.*
Metals, Non-Ferrous, Research, 335
— Tests of. See *Tests (Materials)*
Monel Metal, Properties and Uses, United States, 376
Nickel, Electrolytic Processes, 448
Non-Ferrous Metallurgy in America, 376
— — Metals, British Empire Exhibition, 335
— — Metals, Research, 335
Ore Dressing, Principles and Practice (Review), 619
Osmunds, Early Iron Manufacture, 486*
Pulverised Coal, Use in Metallurgy. See *Pulverised Coal*
Pyrometers. See *Pyrometers*
Refractories. See *Refractory Materials; Firebricks*
Rolling Mills. See *Rolling Mills*
Scrap, Iron and Steel, Classification of, 806
Sherardising Process, Inception and Development, 277*
Slag, Blast-Furnace, Pipe Manufacture, 600
Steel Furnaces. See *Furnaces*
— Manufacture, Classification of Scrap, 806
— — Electrical, 117
— Standard Specimens for Analysis, 439
Titanium, Influence on Iron Castings, 113
Welding. See *Welding*
Zinc Coating, Sherardising Process, Inception and Development, 277*
— Smelting, Resistor Furnaces, for, 449
See also *Iron and Steel Institute; Metals, Institute of; Metallography; Microphotographs; Foundry;* and PARAGRAPH INDEX
Metals, Atomic Structure, Removal of Electrons by Electric Field, 322
— Anti-Friction. See *Alloys* under *Metallurgy*
— Corrosion of. See *Corrosion*
— Electro-Deposited, Hardness of, 599
— Fatigue of. See *Alternating Stress* under *Tests (Materials)*
— Filament Lamps. See *Lamps* under *Electric*
— Inner Structure and Effect of Stress, 715

Metals, Institute of:
Exhibit of Non-Ferrous Metals, British Empire Exhibition, 335
Autumn Lecture on Non-Ferrous Metallurgy in America, by W. M. Corse, 376
Autumn Meeting, London.
Programme, 273
Reports of Discussions, 378, 408
Method of Measuring Internal Stress in Brass Tubes, by R. J. Anderson and E. G. Fahlmann, 378
Experiments on the Working of Nickel for Coinage, by Sir T. K. Rose and J. H. Watson, 378
Seventh Report to the Corrosion Research Committee, by Dr. Bengough and R. May, 378
Extrusion of Brass Rod by the Inverted Process, by R. Genders, 387*. See 379, 415.
Investigation of the Effects of Impurities on Copper; Effect of Iron on Copper, by Dr. D. Hanson and Miss G. W. Ford, 379
Relationship between Tensile Strength, Temperature and Cold Work in Some Pure Metals and Single Solid Solutions, by D. H. Ingall, 408
Effect of Progressive Cold Rolling on the Brinell Hardness of Copper, by H. Moore, 386*. See 408
Experiments on the Effect of Casting Temperature and Heat Treatment on the Properties of a High-Tin Bronze, by F. W. Rowe, 430*. See 409
Metal Spraying and Sprayed Metal, by T. H. Turner and W. E. Ballard, 409
Determination of Sodium in Aluminium, by D. M. Fairlie and G. B. Brook, 409
Experiments on the Influence of Casting Temperature and Mass on the Physical Properties of Admiralty Gun Metal, by F. W. Rowe, 436*. See 409
Metal Moulds for Iron Castings, 377
— Non-Ferrous, British Empire Exhibition, 335
— — Properties and Uses, United States, 376
— — Research, 335
— Plastic Deformation, Effect of Surfaces, 366
— Price Diagrams, 62*, 208*, 338*, 496*, 654*, 780*, 872*
— Spraying, Schoop Process, 409
— Structure of. See *Metallography; Microphotographs*
— Tensile Strength, Temperature and Cold Work, Relationship, 408
— Welding. See *Welding*
— See also *Metallography; Metallurgy; Microphotographs*
Meteorological Data, Wind Power Calculations, 77
— Papers, British Association, 409

Meteorological Society, Royal:
Adaptation of Variety to Climate, by R. A. Fisher, 181
Comparison of Different Types of Radiation Recorder, by W. B. Haines, 181
Brown Corona and the Diameters of Particles, by L. F. Richardson, 592
Photometric Observations on Clouds and Clear Skies, by L. F. Richardson, 592
Notes on Haboobs, by L. J. Sutton, 592
Problem of Mild Polar Climates, by C. E. P. Brooks, 863
Meteorology, Atmospheric Discontinuities and Weather Forecasting, 410
— Atmospheric Pollution, Automatic Measurement, 410
— Cloud Drops, Formula for Diameters, 592
— Mild Polar Climates, 863
— Notes on Haboobs, 592
— Photometric Observations, Clouds and Skies, 592
— Relation of Wind to Height, 410
— Solar Radiation Recorders, Comparisons, 182
— Water Vapour and Air Circulation, 410
Meters, Flow, Compressed Air, (G. Kent, Ltd.), 193*
— Gas, Thomas Electrical, 182*. See *Errata*, 262
— Liquid, Bassler, with Temperature Compensator, 497*
— Steam and Water, Use in Boiler Trials, 56. See LETTERS, 101
— Water, Vee Notch, Lea Closed-in Type, 598*
— See also *Electric* and *Water Meters*
Metre, Standard, Interferometers for Calibrating, Japanese Government, 491*
— — National Physical Laboratory Investigations, 101
Metrology Department, National Physical Laboratory, Work of, 101*; Exhibits, British Empire Exhibition, 129*; Tests of Volumetric Glassware, 378
Metropolitan Carriage, Wagon & Finance Co., Ltd., Control Trailer Car, Metropolitan Railway, 9*; Royal Saloon Coach, Egyptian State Railways, 475*
Metropolitan Railway, Control Trailer Car, 9*
Metropolitan-Vickers Electrical Co., Ltd., Switchgear and Transformers, British Empire Exhibition Colliery, 49*; Tests of 7,000-kw. Turbine, Bristol Corporation, 253*; Turbo-Generator, Brighton Power Station, 372*
Metropolitan. See also *London*
Meyer, P. R., on Large Power Gas Engines, 105*. See 83
Mica, Dielectric Properties, 828
Michell Radial Bearings, Rolling Mills, 769*
— Thrust Bearing, S.S. "Drottningholm," 841*
— — Measuring Gear, Marine Diesel Engine Trials, 785*
Michelson, Prof. A. A., Measurements of Velocity of Light, 738
Microphotographs, Aluminium-Zinc Alloys, Effect of Heat Treatment, 392*
— Bronze, Effect of Casting Temperature, 431*. See 409
— — and Steel, Workshop Apparatus, 515*
— Iron and Steel, High Magnification, 515*
— Steel, Alternating-Stress Tests, 534*
Microscopes, Metallographic, High Power and Workshop, 514*
— Vertical Illuminator for, 30*
Microscopical Examination, Arley Coal, 553
Microstructure of Metals. See *Metallography; Microphotographs*
Middle-Third Theory, Stress Distribution, Extension of, 763*
Midland Railway Carriage, & Wagon Co., Ltd., Pullman Buffet Car, 7; Hopper Wagon, Bengal-Nagpur Railway, 279*
Midlands, West, Electricity District, 745
Military Authorities and Organisation for Munitions Supply, 201
— Light Lorries, War Office Subsidy Specification, 94, 136
Milking, Mechanical, New Zealand Dairy Industry, 289*
Milling Machines and Cutters. See *Machine Tools*
Millington, W. E. W., on the Plastic Deformation of Metals, 366; on the Inner Structure of Metals, 715
Mills, J., & Co., Colliery Haulage Gear, 766*
Mills, Textile, Air-Humidifying Apparatus, Andrew System, 873*
— Rolling. See *Rolling Mills*
Milne-Shaw Seismograph, Correlation of Records, 410
Milnes, H., Small Lathes, 447
Mines, Coal. See *Collieries.*
— Haulage Gear. See *Haulage*
— Sweeping Sloops (Wm. Simons & Co., Ltd.), 460
— Tubs, Creepers and Tipplers, Coal Screening Plant, 338*
— — Gate-End Conveyor for Loading, 227*
— — Weighing Machines for, 338
— United States, Bureau of. See *United States*
— Ventilating Fan, Sirocco, 160*
— Winding. See *Winding*
— See also *Coal; Collieries; Mining; Ores; Winding;* and PARAGRAPH INDEX
Miners, Coal, Health of, 294
— Lamp, Electric, with Turbine-Driven Generator, 530*
— — Caeg Electric, 529
— Wages and Cost of Coal, 521. See 518*
Minerals, Canadian, British Empire Exhibition, 137*. See LETTER, 334
— Indian and Burmese, British Empire Exhibition, 509, 537
— Oils. See *Oils*
— See also *Coal; Mining; Ores;* and PARAGRAPH INDEX
Mining, Coal, Proposed Control, Report, 293
Mining Engineering Co., Ltd., Belt Conveyor for Colliery Workings, 226
— Engineers, Institution of, E. Williams, on Economics of Coal Mining Industry, 518*, 521; Presidential Address by Dr. J. S. Haldane, on the Industrial Machine, 585
— Gold, Robeson-Davidson Slime Pump, 174
— Industry, Canadian, 137*
— — Coal, Economics, 518*, 521
— — Labour Situation, Need for Co-operation, 585
— — South Africa, 204*. See 174*
— — Machinery, Exhibition, Cardiff, 747, 766*, 808
— and Metallurgical Congress, Empire. See *Empire*
— Ore-Dressing, Principles and Practice (Review), 619
— Royalties and Cost of Coal, 294
— See also PARAGRAPH INDEX
Ministry of Transport. See *Transport*
Mirrlees, Watson & Co., Ltd., Centrifugal Pumps, British Empire Exhibition, 5*
Mixed Pressure Turbines. See *Turbines*
M.L. Magneto Syndicate, Ltd., Turbine-Driven Electric Lamp, 530*
M.O. Valve Co., Ltd., Manufacture of Thermionic Valves, 456; Rectifying Valves and Water-Cooled Valves, 492*
Model Makers' Screw-Cutting Lathe, Wade, 749*
— for Stress Determination. See *Optical*
Model Experiments, Cavitation in United States Warships, 717*. See LETTER, 769
— — Propellers, Comparisons, 713
— — See also *Ship Resistance*
Molecular Structure and Band Spectra, 322
Molybdenum Steel, Vibrac, 187*; Oxygen Cylinder, 187*. See *Errata*, 423
Monarch Centrifugal Separator Oil, 274*
Monel Metal, Properties and Uses, 376
Monitor Flow Indicator, Water-Cooling Systems, 548
Monk Bridge Iron and Steel Co., Ltd., Exhibit at British Empire Exhibition, 439.
Monoplane. See *Aeronautics*
Montreal Docks, Electric Locomotives for, 746
"Montrose," H.M. Flotilla Leader, 421
Moore, Dr. H., on Hardness of Copper, 380*. See 408
Moore, H. F., on Evidence for Fatigue Limits, 580*, 658*. See 284
Morrison, J. S., the Late, 706
Mortising Machines. See *Machine Tools*
Morwell Power Scheme, Excavating Machine for Brown Coal, 299*
Motor Boats, Coastal, Thornycroft, British Empire Exhibition, 421*
— — Indian Timber (J. I. Thornycroft & Co., Ltd.), 508*
— — "Invermira" for Venezuela, 800*
— — Seasled Type, 460*
— Car, 12 h.p. Austin, Front-Wheel Brakes, 607*
— — Axles, Drilling Machine for, 359*
— — Axles. See also *Motor-Car Details*
— — Bentley, 3-litre Sporting Model, 579*. See *Erratum*, 610
— — Bodywork, Design and Construction (Review), 663
— — Canadian, British Empire Exhibition, 141*
— — Construction, Standard Steels for, 181
— — Design, Present Tendencies, 553

Motor Car Details:
Back Axle, 8 h.p. Gwynne Car, 579*
— — 40 h.p. Lanchester Car, 607*
Brakes, Front and Back Axle, Lanchester Car, 607*
— Front Wheel, 12 h.p. Austin Car, 607*
— Four-Wheel, Importance of, 553
Clutch, Multi-Plate Type, 11-22 h.p. Wolseley Car, 574*
— Single Plate, 40 h.p. Lanchester Car, 607*
Engines. See *Engines, Petrol, Motor Car*
Front Axle, Fowler Steam Wagon, 856*
— — and Front Wheel Brakes, 20 h.p. Lanchester Car, 607*
— — 8 h.p. Gwynne Car, 579*
Gear Box, Dennis Fire Engine, 385*
— — Epicyclic, 40 h.p. Lanchester Car, 607*
— — Four-Speed (Dorman & Co., Ltd.), 577*
— — 8 h.p. Gwynne Car, 579*
Magneto Drive, Wolseley Car, 574*
Oil-Pump Drive, Wolseley Car, 574*
Universal Joints, Fibre-Disc Type, Dennis Motor Fire Engine, 385*
Motor Cars, Effects of Taxation, 553
— — Engines. See *Engines, Petrol*
— — Engineers. See *Automobile Engineers*
— — Exhibition, Olympia, 553, 574*, 606*. See 587
— — Frames, Pressed Steel (Vickers, Ltd.), 99
— — Fuels. See *Motor Fuels*
— — 10-20 h.p. Galloway, Improvements, 574
— — Gear Boxes. See *Motor-Car Details*
— — 8 h.p. Gwynne, 577*
— — Industry, British, Position, 553, 587
— — Industry, Use of Light Alloys, 455
— — Lamda-Lancia, Girder Side Frames, 575*
— — 20 h.p. and 40 h.p. Lanchester, 606*
— — 10 h.p. Lea-Francis, 610*
— — Light Three-Wheeled, the D'Yrsan, 653
— — Lighting Equipment, 260
— — Manufacture, Iron and Steel Castings, Standard Specifications, 176
— — 20 h.p. Rolls-Royce, 575*
— — 14-40 h.p. Sunbeam, 609*
— — Traffic, Road Illumination, 260. See 458
— — Turkish Market, 681
— — Tyres, Standard Valves and Rims, 261
— — Use of Low-Pressure Tyres, 805
— — 11-22 h.p. Wolseley, 574*
— — Works, Proposed, at Dagenham, Ford Motor Co., 91
— — See also *Motor Cycles* and PARAGRAPH INDEX
— Carriages, Railway. See *Carriages*
— Converter Substation, Automatic, Peebles-Reyrolle System, 323*
— Cycle British Export Trade, 652
— — Fire Extinguisher, 653
— — Frame, Francis & Barnett Triangulated, 653*
— — 2¾ h.p. Humber, 653*
— — Show, Olympia, 652*
— — 350 c.c. Rover, 652*
— — Standard Rims for Tyres, 261
— — Trend of Design, 652
— — Engines. See *Engines, Petrol, Motor-Cycle*
— Electric, Alternating Current, Ironclad Starting Panel (Brookhirst), 580*
— — Alternating Current, Recent Developments, 79
— — Austin Constant-Current System, Ships' Winches, 734*
— — Breakdowns, Report, 418
— — and Centrifugal Pumps, Remote Control, 671*
— — Direct-Current, Automatic Starter and Regulator (Brookhirst), 580*
— — Fractional Horse-Power (Wilson-Wolf Engineering Co., Ltd.), 700
— — Induction, Auto-Transformer Starter (Erskine, Heap & Co., Ltd.), 107*
— — Induction, and Turbine Pump, 625*
— — Principles and Control (Review), 556
— — Road Traction, Characteristics, 688*, 690*
— — Starting and Control Gear, Automatic Sub-Station Equipment, 13*

Motor Electric, Starting and Control Gear, Colliery Work, (G. Ellison), 51* ; (Mavor & Coulson, Ltd.), 224*
— — Starting and Control Gear, Winding Engine, 852*. See 789*
— — Starting and Control Panels, Machine Tools, 447
— — 2,600 h.p. Synchronous, Newfoundland Water Power Plant, 127*
— — Synchronous, Use as Condensers, 109
— — Undercutter for Commutator Insulation, 621*
— — Welding Machine for Windings, 764*
— Fire Engines. See *Fire Engines*
— Fuels Committee, Empire, Report, 616
— Hydraulic, Swash-Plate Type, Armstrong Variable-Speed Gear, 187*
— Internal-Combustion. See *Aeronautics ; Engines ; Motor Cars ; Motor Boats ; Tractors*
— Launches. See *Motor Boats*
— Life Boats, British and Foreign, 16. See *Erratum*, 207
— Lorries. See *Motor Wagons*
— Manufacturers and Traders, Society of, Dinner, 587
— Marine. See *Engines ; Marine Propulsion ; Motor Ships*
— Omnibuses and London Traffic Problem, 522. See 640, 647
— — Petrol, Comparisons with Electric Vehicles, 719. See 688*
— — Schemes in Parliament, 777
— Paraffin. See *Engines, Oil*
— Petrol. See *Aeronautics ; Engines, Petrol ; Motor Boats ; Motor Cars ; Tractors*
— Rail Car, Petrol, Four-Wheel Drive, 817*
— Road Rollers. See *Road Rollers*
— Ship "Cubore," Trials and Working Results, 714
— — Development and Present Position, 52, 99, 119, 120, 148
— — Diesel Engines, Two-Stroke and Four-Stroke Cycles, 120
— — Dutch, Propelling Machinery, 119
— — "Moveria," Donaldson Line, Launch, 548
— — "Nabha," Shallow-Draught, Hospital Service, 421*
— — "Silurian," Trials, 643
— — "Seekonk," Conversion from Steam, 714
— — "Sycamore," Trials of Diesel Engines, 730, 750*, 784*, 798
— — "Swanley," Maiden Voyage, 229
— — Swedish Developments, 148. See 120.
— — See also *Marine Propulsion*
— — "Vulcan," Diesel-Hydraulic Drive, 92*, 369*
— Spirit. See *Motor Fuel*
— Tanker "British Aviator," Trials, 236, 369
— Tractors. See *Tractors*
— Transport Development, 85
— — Early History, 681
— — Maintenance of Commercial Vehicles, 712
— — and Road Construction, 24
— — Road, Treatise on (Review), 809
— Tugs, Comparison with Steam, 517
— — Diesel-Electric System, New York, 714
— — Egyptian Government, 517*
— Vehicles, Commercial, Design from Maintenance Standpoint, 712
— — Development of, Influence of Road Conditions, 87, 874*
— — Electric Battery Passenger Cars, British Empire Exhibition, 198
— — Electric Battery, Petrol-Electric, and Railless Trolley Types, 688*, 719
— — Petrol and Electric Battery, Cost Comparisons, 720
— — Traffic on Roads, Census of, 837
— Wagon, Ford, with Fire Pump, 386*
— — Light, War Office Subsidy, 94, 136
— — 3-ton Petrol (Karrier Motor Co., Ltd.), 372
— — Steam, Early Use in India, 681
— — Tipping Frame, Refuse Collection, Pagefield System, 655*
Mott, B., on Metropolitan Engineering, 640. See 647, 676
Moulds, Foundry, Drying Stoves, Gas and Coke Firing, 460
— Metal, for Iron Castings, 377
Moullin Torsionmeter, Marine Diesel-Engine Trials, 731. See 785
Mount Everest Expedition, Oxygen Cylinder, 187*. See *Errata*, 423 ; Ladder Bridge, 304*
— Wilson Observatory, Measurements of Velocity of Light, 738
Mountain Railway, Penang Hills, 664*, 726*, 789*, 852*
"Moveria," M.S., Donaldson Line, Launch, 548
Moylan, W. M., the Late, 327
Mule, Cotton-Spinning, 91*
Multitubular Boilers. See *Boilers*
Municipal Affairs, Engineers' Part in, 375
— and County Engineers, Institution of, Annual Meeting, 24
— Engineers, Duties of, 24
— Tramways. See *Tramways*
— Work, Refuse Collection, Pagefield System, 655*
Munitions Supply, Engineers and Industrial Organisation, 201
Mushet Tool Steel, 447

N.

"NABHA," Shallow-Draught Motor-Ship, Hospital Service, 421*
Nagel, Dr. A., on Diesel Engines, 110*. See 83
Nailing Machine, Box Manufacture, 544*
Nash, A. W., on Fuel-Oil Resources and Somerset Oil Shales, 777
Nash Point, Wireless Beacon Station, 582
Nasmith Combing Machine for Cotton, 90*
National Acme Co., Automatic Machine, 442*
National Gas Engine Co., Ltd., Oil Engines, Leicester Agricultural Show, 21*
— Life-Boat Institution, Centenary, 16. See *Erratum*, 207
National Physical Laboratory, Report on Work, 5, 100*, 334 ; Metrology Section, British Empire Exhibition, 129* ; Metrology Section, Tests on Volumetric Glassware, 378 ; Physics Section, British Empire Exhibition, 278* ; Froude Tank, Report on Work, 334 ; Refrigerat on Research, 742*
Natural Gas, Measurement, Compression and Transmission (Review), 620
— — Supply, Edmonton, Canada, 539
— History of Crystals (Review), 631
— Steam, Power Production from, 78
Naval Aeronautics. See *Aeronautics*
Naval Architects, Institution of :
Marine Oil Engine Trials Committee, First Report, 750*, 784*. See 730, 798
Joint Summer Meeting with Institution of Engineers and Shipbuilders in Scotland and North-East Coast Institution of Engineers and Shipbuilders :
Banquet, Social Functions, &c., 25, 26
Progress in Marine Propulsion during the last Ten Years and Some of its Possibilities, by Sir A. C. Ross, 25
New Type of Double-Acting Diesel Engine for Marine Purposes, by G. J. Lugt and H. Hunter, 26*
Displacement-Draught Formulæ, by W. H. Riddlesworth, 26
Naval Architects and Marine Engineers, American Society of :
Aeronautics in Naval Architecture, by Commander J. C. Hunsaker, 722. See 713
Hydraulic Sea-going Hopper Dredgers, by Capt. W. D. Styer, 713
Self-Unloading Bulk-Cargo Vessels of the Great Lakes, by H. Penton and Prof. H. C. Sadler, 723*. See *Erratum*, 863
Comparison of Model-Propeller Experiments in Three Nations, by Rear-Admiral D. W. Taylor, 713
Extent of Cavitation in U.S. Scouts and Destroyers, by Capt. E. F. Eggert, 717*. See LETTER, 769
Design and Construction of Refrigerator Ships, by L. Williams, 713
Application of Fuel Conservation and Engineering Performance Standards to Shipping Board Vessels, by C. J. Jefferson, 714
Scrapping Warships, by Commander H. E. Rossell, 714
Trials and Operation of the M.S. "Cubore," by A. B. Homer, 714
Conversion of the Hog Island Steamer "Seekonk" to a Motor Ship, by J. C. Shaw, 714
New York Harbour Tug, Diesel-Electric Drive, by F. L. Du Bosque, 714
Naval Architecture, Aeronautics in, 722. See 713
— — See also *Warships*
— Armaments, Washington Treaty and Gun Power of United States Battleships, 331
— Construction Programme, Soviet, 651
— — See also *Warships*
— Exhibits, British Empire Exhibition, 185*, 420*, 458*. See LETTER, 486. See *Errata*, 423
— Guns. See *Guns*
— and Shipping Annual, Brassey's (Review), 809
— Warfare. See *Warships*
— See also *Warships*
Navigation, Aerial. See *Aeronautics*
— Inland, River Seine Regulation Works, 682*
— — River St. Lawrence, Development, 239*, 271*. See 267
— — and Water-Power Development, 43
— Wireless Telegraphy in. See *Telegraphy, Wireless*
Navy, British. See *H.M.* under *Warships*
— French, Committee on Marine Engineering, 524
— — Estimated Expenditure, 780
— — New Construction, 453, 572, 582, 871
— — Recruitment of Officers from Ecole Polytechnique, 554
— — Reorganisation of High Command, 839
— — Scientific Research, 854
— — Submarines for Convoy Duty, 587
— German. See *German navy* under *Warships*
— Italian, Autumn Manœuvres, 806
— — New Destroyers, 582
— United States. See *United States* under *Warships*
— See also *Naval ; Warships ;* and PARAGRAPH INDEX
Navvy, Steam. See *Excavating Machine*
Nebulæ, Spectra of, 410
Needham, E. S., on Irish Bascule Bridge, 758*
Nelson Dobby, Cotton Weaving, 249*
Nelson, R., on Electricity in Coal Mines, 243
Netherlands. See *Dutch ; Holland*
Neuhaus, Dr. F., on Standardisation in Germany, 149. See 120
New Fortuna Machine Co., Ltd., Tube-Bending Machine, 445*
— York-Azores Telegraph Cable, 461
— — Harbour, Dredging Approaches, 713
— — Harbour Tug, Diesel-Electric, 714
— Zealand Exhibits, British Empire Exhibition, 287*
— Power Resources, 19, 31
Newcastle-on-Tyne Electric Supply Company, North Tees Power Station, 57*
Newfoundland Hydro-Electric Power Plant, Paper Manufacture, 125*
Newlay Wheel Company, Ltd., Railway Wheels, 438
Niagara Falls, Queenston-Chippawa Power Development, 220*, 255*. See 267
Nickel, Electro-Deposited, Hardness of, 599
— Electrolytic Processes, 448
— Iron Accumulators, Road Traction, 719
— and Nickel Alloys, Properties and Uses, United States, 576
— — Alloys, Tensile Strength, Temperature and Cold Work, Relationship, 408
— Steel Blading, English Electric Co.'s Turbo-Generator, 762*
Nickel Steel, Influence of Mass on Heat Treatment, 5
— Working for Coinage, 378
Nigerian Products, Ltd., Palm-Oil Extracting Plant, 513*
Nile Tourist Steamers, Converted Hospital Ships, 463*
Nitrogen, Activation, Gaseous Explosions, 448
— Atmospheric, Fixation, Report, 116
— Products, Synthetic Manufacture, Franco-German Agreement, 263. See 372
Noguchi, K., on a New Harmonic Analyser, 876*. See 651
Non-Conducting Coverings. See *Heat Insulation*
Non-Ferrous Metals. See *Metals ; Metallurgy*
Nordberg, Dr. B. V., the Late, 706
Nordström, V., on Steam Turbines for Extra High Pressures, 178. See 45
Norris, Henty & Gardners, Ltd., Gardner Oil Engine, 595*
North-British Locomotive Co., Ltd., Geared-Turbine Locomotive, 479*
— East Coast Institution of Engineers and Shipbuilders, Joint Summer Meeting with Institution of Naval Architects. See *Naval Architects ;* Presidential Address by T. Westgarth, on the Industrial Machine, 585 ; Oil Fuel for Marine Internal-Combustion Engines, by S. B. Freeman, 836
— Eastern Werkspoor Double-Acting Diesel Engine, 26*
— Notes from, 15, 53, 95, 133, 167, 199, 229, 261, 291, 329, 373, 415, 453, 487, 518, 549, 583, 613, 645, 677, 707, 739, 771, 803 833, 863. See PARAGRAH INDEX
— Tees Power Station, Thermodynamic Design, 57*
Norton & Gregory Scholarships, 685
Norway, Domestic Uses of Electric Power, 84
— Electric Power Supply, Bergen and Kristiania, 85
— Export of Electrical Power, 78, 114, 213
— Power Development, Financing Loans, 36
— — Resources, 32. See 19
— Railway Electrification, 118
Norwegian Railways, Petrol-Driven Repair Car, 817*
— Water Power Plants, Ice Troubles, 73. See 45, 463
Notched-Bar Tests. See *Tests (Materials)*
Notes, Labour. See under *Labour*
— on New Books. See *Books* and LITERATURE INDEX
— See *Cleveland ; North ; South West ; South-Yorkshire ;* and PARAGRAPH INDEX
Nozzles, Atomising, Air-Humidifying Apparatus, 874*
— Steam Turbine, Proportioning, 473*
Nuts, Palm, Oil Extracting and Kernel Separating Plant, 513*

O.

Obituary:
Bamber, H. K. G., 462
Barnard, H. C., 686
Bastian, C. O., 654
Bellby, Sir G., 202*
Bertin, L. E., 744
Boveri, Dr. W., 622
Bridge, Admiral Sir C., 268
Brown, Lieut.-Col. W., 653
Clarke, Engineer-Commander, W. H., 622
Crighton, R., 327
Duncan, R., 800
Dunlap, J. H., 229
Fitzmaurice, Sir M., 710*
Inglis, G., 133
Gilkes, G., 268
Clover, A. W., 518
Gobey, F. E., 518
Grantham, R. F., 486
Gray, Sir W C., 654
Hall, M. L., 832
Herdman, Sir W. A., 141
Hood, D. W., 650*
Hughes, J., 15
Lanme, B. G., 94
Langdon-Davies, W., 862
Lumsden, T., 229
McGregor, T., 780
McLean, W., 707
Morrison, J. S., 706
Moylan, W. M., 327
Nordberg, Dr. B. V., 706
Platt, F. J., 839
Pollok, R., 811
Robertson, F., 653
Rowe, G., 462
Smithers, Sir A. W., 291
Stuart, J., 706
Tempest, Sir P., 649
Terry, S. H., 832
Thomson, C., 349.
Obrcen, J. E., Steel Tubular Construction, 674*. See 716
O'Brien, Lieut.-Col. E., on Railway Electrification, 456
Observatory, Mount Wilson, Measurements of Velocity of Light, 738
— Poulkovo, Solar Spectrograph, 87*
Odontometer, Gear-Tooth Measurement, 822*
O'Grady, S. C., Automatic Intake Control, 432*
Oil Consumption, Diesel Engines, Report, 715
— Cracking, Recent Developments, 523
— Engines. See *Engines, Oil ; Motor Cars ; Motor Boats ; Tractors*
— Fires, Suds Fire Engine for Extinguishing, 530*
— Fuel, Canadian Resources, 38, 480. See LETTER, 102
— — Bassler Meter for, 497*
— — Burner, Gardner Oil Engine, 598*
— — Burner, Wallsend-Howden Low Air Pressure, 347*
— — Burning Apparatus, Wallsend-Howden System, 345*
— — Consumption, Marine Oil Engines, Report, 730, 750*, 784*, 798
— — Duplex and Rotary Pumps for, 856*
— — Future Resources, 777. See 31, 119, 265, 765, 836
Oil Fuel Injection, Spring-Plunger System Blackstone Oil Engine, 60*, 639*
— — Installation, Cochran Boiler, 501*
— — Installation, Korting System, Cable Steamer "Edouard Suenson," 197*
— — Internal-Combustion Engines, Standard Specifications, 692
— — Marine Diesel Engines and Boilers, 836
— — Pipe Lines, Design, 792, 823*, 853*
— — Physical and Chemical Properties, Marine Diesel Engine Trials, 751, 784
— — Supply, Marine Propulsion, 119, 265, 765
— — Supplies, United States Navy, 765
— — Use in Municipal Undertakings, 24
— Insulating, De Laval-Watson Testing Apparatus, 877*
— Groove Cutting Machine, 444*
— Lamp, Long-Burning, Railway Signals, 9
— Motors. See *Engines, Oil ; Motor Boats ; Motor Cars ; Tractors*
— Palm, Extracting and Kernel Separating Plant, 513*
— Petroleum, United States Production and Consumption, 765
— Pressure Governor, Hydraulic Turbines, 610*
— Production, Swedish Oil Shales, 39
— — British Empire, Needs and Resources, 31
— Pump, Mechanical Lubricator for Locomotives, 163*
— — Turbine-Driven, Turbo Generator, 762*
— Purification, Monarch Centrifugal Separator, 274*
— Shale, Distilling Plant, Crozier System, 538*
— — Somerset and Welsh, Properties and Uses, 777
— Switches. See *Switchgear*
— Tractors. See *Tractors*
— Transformer, De Laval-Watson Testing Apparatus, 877*
— — Filter Press for, 768*
— See also *Lubrication ; Petroleum*
Oilfields of Argentina, 651
Oldham & Son, Ltd., Stone Dusting Machine for Collieries, 808
Olsen Fatigue Testing Machine, 813*
Olympia. See *Exhibition*
Omnibus, Motor. See *Motor Omnibus*
Ontario, Queenston-Chippawa Hydro-Electric Development, 220*, 255*. See 267
Open-Hearth Furnace. See *Furnace*
Opening Bridges. See *Bridges*
— Machines for Cotton, 12*
Optical Apparatus, Calibration of Standard Metre, Japanese Government, 491*
— Diffraction, Theory of, 548
— Methods, Stress Determination, Discussion on, 284. See LETTERS, 462, 704, 769
— Society : Problems in the Theory of Optical Diffraction, by E. T. Hanson, 548 ; Annealing and Re-annealing of Glass, by W. M. Hampton, 548
Optics, Fused Silica Lenses, 296
— Interference Method, Testing Gauge Surfaces, 129*
— Vertical Illuminator for Microscopes, 30*
— Work of National Physical Laboratory, 6
"Orama," S.S. Orient Liner, 543*. 601*, 643
Ordnance. See *Guns ; Warships*
Ore, Copper, Outokumper Deposits, Finland, 501
— Dressing, Principles and Practice (Review), 619
— Iron, Electric Smelting, Resistance of Coke and Charcoal, 637
— Metalliferous, Formation of Deposits, 588
Organic Chemistry. See *Chemistry*
Orient Liner "Orama," 543*, 601*, 643
— — "Oronsay," Launch, 265
Orifices, Measurement of Gas Flow, Balanced Manometer, 223*
Ormandy, Dr. W. R., on Research, 551
"Oronsay," Orient Liner, Launch, 265
Orsted Medal, Presentation to Prof. Bohr, 733
Orwell Electric Vehicles, 689*. See 719
Osborn, S., & Co., Ltd., Tool Steel, 447
Oscillations, Electric. See *Valves, Thermionic ; Telegraphy, Wireless ; Telephony, Wireless*
Osmunds, Early Iron Manufacture, 486*
Outokumper Copper Deposits, Finland, 501
Ovens, Coke. See *Coke Ovens*
Overhead Cranes. See *Cranes*
Overseas Trade Department, Report on German Iron and Steel Trade, 228 ; Report on Economic Conditions of France, 332 ; British Industries Fair, 524 ; Report on Egyptian Industries, 586 ; Reports on Economic Conditions, Turkey and Colombia, 680 ; Report on Trade of Dutch East Indies, 832
Owen, Capt. B. J., Drying Crops, 554*
Oxford Institute of Agricultural Engineering, Artificial Drying of Crops, 554*
Oxy-Acetylene Blowpipe. See *Blowpipe*
— — Welding. See *Welding*
Oxygen Cylinder, Vibrac Steel, 187*. See *Errata*, 423
— Determination in Pure Iron, 366
— Iron Alloys, Constitution of, 366
— Jet Cutting Machine, Godfrey, 124*
Ozalid Dry Photo-Printing Process, 660

P.

PADDLE Steamers, Conversion to Stern Wheelers, 463*
Paddy Eliminating Machine, Rice Preparation, 537*
Pagefield System of Refuse Collection, 655*
Palestine, Tacheometry in, Use of Horizontal Staff, 505*
Palm-Oil Extraction Plant for Nigeria, 513*
Palmers Shipbuilding and Iron Company, Ltd., Palmer-Camellaird-Fullagar Diesel Engine, Piston Withdrawal, 145* ; Trials of M.S. "British Aviator," 236, 369
Panama Canal, Report on Working, 745
— — Ten Years' Operation, 491
Pape & Bennison, Commutator Insulation Undercutter, 621
Paper Making Industry, Canada, 138, 302, 539
— Manufacture, Newfoundland, Hydro-Electric Power Plant, 125*
— — United States, Application of Power, 85

Paper Manufacture, Use of Rubber Latex, 776
— Supply, United States, 692
Paraffin Engines. See *Engines, Oil*
— Tractors. See *Tractors*
Paragon Air Pump, 217
Paris Floods, Seine Regulation Works, 682*
Parker Low-Temperature Carbonisation Plant, Trials, 588*
Parkinson, J., & Son, Milling Machines and Dividing Head, 355*; Sunderland Gear Planer, 363*; Gear Testing Machine, 696*
Parliament, Engineering Schemes in, 776
Parsons Line, Coal Consumption, St. Pancras Power Station, 642*
Parsons, C. A., & Co., Ltd., Clink Detector, Steel Forgings, 658*
Parsons, Sir C. A., on Steam Turbines, 63*, 469. See 45; Earth Boring Scheme, 548
— Turbines. See *Turbines, Steam; Marine Propulsion*
Passenger Cars, Accumulator, British Empire Exhibition, 198
— Steamers. See *Steamers*
Patent Applications, Examiners' Searches, 462
— Laws, Soviet Government, 554
— Novelty and Prior Publication, 264
— Record, 34*, 152*, 184*, 246*, 307*, 395*, 471*, 504*, 567*, 661*, 693*, 755*, 788*, 849*, 879*. See PATENT RECORD INDEX
Patentees, Institute of, Exhibition of Inventions, 236. See 801
" Patoka," U.S.S., Floating Airship Base, 490
Payment of Labour. See *Labour*
Pearn, F., & Co., Ltd., Three-Throw Pump, 159*
Pearn-Richards Facing, Boring, Milling, Drilling and Tapping Machine, 314
Peat, Chain-Grate Stoker for, 41*
— Production and Use as Fuel, 39
Peebles, B., & Co., Ltd., Automatic Substation Equipment, 323*
Penang Hills Railway, 664*, 726*, 789*, 852*
Pennell, R. H. L., on Water Supply, Egyptian Towns, 735
Pennell Rotary Trap, Sewage Pumps, 218*
Penstocks, Queenston-Chippawa Hydro-Electric Development, 223*
Penton, H., on Self-Unloading Cargo Vessels, 723*. See *Erratum*, 863
Permanent Magnets. See *Magnets*
— Way Construction, Penang Hills Railway, 726*
Pervac Extraction Pump, 217*
Petrol Carburettors. See *Carburettors*
— Electric Vehicles, Characteristics and Uses, 688*, 719
— Fires, Suds Fire Engine for Extinguishing, 530*
— Manufacture, Cracking Processes, 523
— Measuring Pump, Canadian, 141*
— Motors. See *Aeronautics; Engines, Petrol; Motor Cars; Motor Boats; Tractors*
— Tractors. See *Tractors*
Petroleum Cracking Processes, 523
— Fields of Argentina, 651
— Pipe Lines for, Design, 702, 823*, 853*
— Production, British Empire, Needs and Resources, 31
— Technologists, Institution of, Dr. A. E. Dunstan and R. Pilkethley on Developments in Oil Cracking, 523; Oilfields of Argentina, by C. Hunter, 651; Fuel Oil Resources of the Future, by H.G. Shatwell and A. W. Nash, 777; Somerset Oil Shales, by H. G. Shatwell, A. W. Nash, and J. I. Graham, 777
— United States Production and Consumption, 765
— See also *Oil; Engines, Oil*
Petters, Ltd., Two-Stroke Oil Engines, 720*
Philpot, Prof. H. P., on Impact Tests, 286
Photo-Elasticity. See *Optical Determination of Stress*
— Electrons, Production of X-rays by, 323
Photographic Lenses, Hilger's Interferometer for Testing, 6
— Surveying, Gordon System, 142
Photometric Observations, Clouds and Skies, 592
Photometry, Heterochromatic, International Committee, 175
— National and International Aspects, 77. See 175
— Proposed Light Standard, 175
— Vocabulary of, 175
— Work of National Physical Laboratory, 101
Photomicrographs. See *Microphotographs*
Photo Printing, Ozalid True-to-Scale Process, 660
Physical Chemistry. See *Chemistry*
— Laboratory. See *National Physical*

Physical Society :

Temperature Gradient in Gases at Various Pressures, by W. Mandell & J. West, 686
Vectorial Dimensions, by J. F. S. Ross, 686
Electrical Method of Producing Vowel Sounds and its Application to Wireless Telegraphy, by Dr. W. H. Eccles and N. F. A. Wagstaffe, 828
Dielectric Properties of Mica, by D. W. Dye and L. Hartshorn, 828

Physics, Atomic Disintegration, Ejection of Protons, 368
— Atomic Structure, Metals, Removal of Electrons by Electric Field, 322
— Band Spectra and Molecular Structure, 322
— Crystals, Metallic, Surface Phenomena, 368
— — Natural History of (Review), 631
— — Structure, Analysis by X-Rays, 349*, 368, 428
— — Structure and Refractive Index, 368
— — Structure, Solid Argon, 368
— Gamma Rays, Scattering of, 323
— Institute of, Electrical Precipitation, by Sir O. Lodge, 648. See LETTER, 676
— Light, Scattering of, 367
— Mercury Atoms, Orbital Transfers of Electrons, 367
— Metastability of Helium Atom, 322
— Quantum Theory and Scattering of X-Rays, 322
— Radiation, Critical Potentials in, 322
— — Secondary and Tertiary, from X-Rays, 323
Physics, Relativity, Eistein's Theory, 535
— Section, National Physical Laboratory, British Empire Exhibition, 278*
— Specific Gravity Determination, Powdered Firebrick, 482
— Spectra of Gases at Low Temperatures, 367
— — of Ionised Elements, 321*
— Spectrum of Titanium, 322
— Velocity of Light, Measurement, 738
— Work of Lord Kelvin, 97. See 104
— — of National Physical Laboratory, 6
— X-Rays, Production by Photo-Electrons, 323
Pickling, Steel, Tinplate Manufacture, 365
Piette Coke Ovens, Shelton Iron Works, 510*
Pig Iron Prices. See *Metal-Price Diagrams*
Piles, Ferro-Concrete, Advantages of Ciment Fondu, 739
— — Bascule Bridge Foundations, 758*
— Timber, Deterioration and Preservation (Review), 589
Piling, Compressed Concrete, Air-Pressure System, 414*
— Steel Sheet, Dam, Gladstone Dock Construction, 48*
— Timber, Deterioration in Sea Water, 775
Pilkethley, R., on Oil Cracking, 523
Pinions. See *Gears; Gearing; Marine Propulsion*
Pipe-Bending Machine. See *Machine Tools*
— Joints, Victaulic, Cleaning Water Mains, 14; British Empire Exhibition Colliery, 193*
— Line Anchorages, Stress Distribution, 763*
— — Bombay Water Supply, 562*
— — Floating, for Dredging Work, 438. See *Erratum*, 486
— — Oil-Fuel, Design, 792, 823*, 853*
— — Self-Closing Valves for, 143*
— Manufacture, Blast-Furnace Slag, 600
— Riveted Steel, Bombay Water Supply, Construction, 562*
— Screwing Machine. See *Machine Tools*
— Steam. See *Steam Pipes*
— Steel, British Empire Exhibition, 439
— See also *Tubes*
Pistons, Diesel Engine, Water Cooling, Duplex Pump for, 5*
— Leakage, Double-Acting Diesel Engines, Test Valve, 28*
— Motor-Car Engine, Use of Light Alloys, 455
— Removal, Palmer - Camellaird - Fullagar Diesel Engine, 145*
— Rings, Cast-Iron Pots for, Specification, 583
— — Standard, Motor-Car Engines, 175
— Valve Liner Ports, Milling Attachment, 354*
Pitot Tubes, Balanced Manometer for, 223*
Pit-Prop Withdrawing Appliances, 528*
Pitter Gauge and Precision Tool Co., Ltd., Sensitive Level Comparator, 129*
Pitting. See *Corrosion*
Planimeter, Averaging Charts, Recording Instruments, 207*
Planing Machine. See *Machine Tools*
Plastic Deformation, Metals, Effect of Free Surfaces, 366
Plates, Circular, Deflection of, 286
— Steel, British Empire Exhibition, 439, 440
— — Oxygen-Jet Cutting Machine, Godfrey, 124*
— — Prices. See *Metal-Price Diagrams*
Plating, Electro. See *Electro*
Platt Brothers & Co., Ltd., Cotton Machinery, British Empire Exhibition, 11*
Platt, F. J., the Late, 839
Plough, Four-Furrow, Anti-Balance, for Cable Ploughing, 516*. See 382, 807
— New Zealand Manufacture, 289*
— and Rein-Drive Tractor, 20, 59*
Ploughing Tackle, Cable, Steam and Internal-Combustion Engine, Fowler's, 382. See 516*, 807
Pluto Stoker Co., Furnace Arch, 113*
Pneumatic Tyres, Low-Pressure, Motor Car, Advantages, 805
— — Road Vehicles, Invention of, 681
— — Valves and Rims, Standard Specifications, 261
— Tools. See *Machine Tools*
— See also *Compressed Air; Air Compressor*
Points, Railway, Planing Machine for, 688*
— — Westinghouse Double-Wire Operating System, 163*
Poisonous Gases, Respirators for Use in, 149*
Polar Regions, Climate of, 863
Press. See *Machine Tools*
Pressed-Steel Work (Vickers Ltd.), 99
Pressure Piling Co., Ltd., Compressed Concrete Piling, 414*
Polarised Light. See *Optical Determination of Stress*
Police Court Ventilation, Fanmakers' Company Prize, 754
Politics, Engineers' Part in, 375
Pollard, F., & Co., Ltd., Drilling Machines, 315*, 406*, 441*
Pollok, R., the Late, 811
Pollution, Atmospheric, Automatic Measurement, 410
— — Report on Alkali Works, 128
Polytechnic. See *Education*
Ponts et Chaussées Department, River Seine Regulation Works, 682*
Pooley & Austin, Fractional Horse-Power Electric Motors, 700
Port of Bristol, Oil Engines Grain Elevator, 643*
— of Colombo, Depth Requirements, 457
— of Durban, South Africa, British Empire Exhibition, 173; Electric Crane, Congella Dock, 104*. See 238
— Facilities and Coastal Shipping, 774
— — Great Britain, Report, 715
— of Liverpool, Gladstone Dock System, 47*
— of London, Report on, 554
— — Road Improvements, 572*
— of Tripoli, Position and Possibilities, 838
Ports, Piston-Valve Liners, Milling Attachment for, 354*
Portable Engine. See *Engine*
— Machine Tools. See *Machine Tools*
Portland Cement. See *Cement*
Post Office Restrictions, Amateur Wireless Transmitters, 457
Potter & Johnston Machine Co., Chucking Machine, 400*
Poulkovo Observatory, Solar Spectrograph, 87*
Powdered Coal. See *Pulverised Coal*
— Firebrick, Determination of Specific Gravity, 482
Power Alcohol. See *Alcohol; Motor Fuels*
— Conference. See *World Power Conference*
— Development, Government Policies, 37
— — and Human Progress, 36, 37
— — Norway, Financing Loans, 36
— Distribution, Electric, Austin Constant-Current System, 734*
— Electric, Domestic Uses, 84
— — Electro-Chemical Industries, 116
— — Export from Norway, 78, 114, 213
— — Generating Costs, Diesel Engines, 715
— — Industrial Uses, 85
— — Supply in London Area, 171
— — for Swedish Tramways, 118
— — Transmission and Distribution, 78, 79
— — Use in Agriculture, 84, 116, 382
— — Use in Rhodesia, 85
— Factor Meter, Recording, 207*
— Gas. See *Gas; Engines, Gas; Producers*
— Hammer. See *Hammer* under *Machine Tools*
— Measurement, International Standardisation in, 121
— Plants, Factory, Utilisation of Waste Steam and Surplus Power, 75
— — French Legislation, 37
— — Hydro - Electric, Aberdeen - Laxapana Scheme, Ceylon, 473*
— — Hydro-Electric, Canada, International Joint Commission, 37
— — Hydro-Electric, Cedars Rapids, River St. Lawrence, 239*. See 267, 271
— — Hydro-Electric, Design of Turbines, 63
— — Hydro - Electric, Electrically - Heated Screens, Ice Prevention, 74
— — Hydro-Electric, in France, 42
— — Hydro-Electric, Ice Troubles, 45, 73, 241*, 463
— — Hydro-Electric, Lilla Edet, Turbine Design, 63
— — Hydro-Electric, Low Heads, Lawaczeck Turbines, 63, 434*, 851*
— — Hydro-Electric, Newfoundland, Paper Manufacture, 125*
— — Hydro-Electric, New Zealand, Development, 290
— — Hydro-Electric, Queenston-Chippawa Development, 220*, 255*. See 267
— — Hydro-Electric, River Tirso, Sardinia, 632*
— — Hydro-Electric, Standard Methods of Testing, 51, 145
— — Hydro-Electric, in Sweden, 43
— — Hydro-Electric, Sweden, Arch Dam Design, 76
— — Hydro-Electric, United States, Turbine Design, 71. See 45
— — Hydro-Electric, Tasmania, Self-Closing Valve for Pipe Line, 143*
— — Hydro-Electric, Turbine Draught Tubes, 153*
— — Steam, Auxiliary, Water-Power Plants, 42, 503
— — State *versus* Private Management, 209
— — Steam, Swedish Practice, 503
— — Use of Steam Accumulators, 68*
— — See also *Power Stations; Power, Water; Substations*
— Policy of Sweden, 35
— Production, Alcohol for. See *Alcohol; Motor Fuels*
— — British Empire, Financial Considerations, 35
— — from Earth Steam Emanations, 78
— — Mercury-Vapour Turbine, 42
— — Social Aspect, 36, 37
— — Steam, United States, Practice, 39
— — United States Iron and Steel Industry, 84
— Press. See *Machine Tools*
— Resources, World's, 18, 31
— for Ship Propulsion. See *Marine Propulsion; Ship Resistance*
— Stations, Electric, Advantages of High-Steam Pressures, 41, 181*, 432
— — Electric, Bristol, Tests of Turbo-Generator, 253*
— — Electric, Carville, Comparisons with North Tees, 57*
— — Electric, Chicago, 50,000-kw. Turbo Generator, 66*. See 45
— — Electric, at Collieries, Report, 293
— — Electric, Continuity of Operation, 112
— — Electric, Dalmarnock, Smokeless-Fuel Plant, 491, 682
— — Electric, Fuel Consumption, 377
— — Electric, Grove Road, London, Tests of Turbo Generator, 704
— — Electric, Lakeside, Coal Handling, 592
— — Electric, Londonderry, Yarrow Boilers, 177*
— — Electric, Marylebone, Transport of Turbo-Alternator Stator, 552
— — Electric, North Tees, Thermodynamic Design, 57*
— — Electric, Report of Electricity Commissioners, 377
— — Electric, Southwick, Brighton Corporation, Extensions, 372*. See 415
— — Electric, St. Pancras, Extensions and Efficiency, 642*
— — Electric, Stuart Street, Manchester, Turbo-Generator Tests, 668
— — Electric, United States, Current Practice, 39; Electrical Equipment, 108
— — Gas-Driven, Barrow Hematite Steel Co., Working Results, 830*
— — Luton, Tests of Stal-Ljungström Turbo-Generator, 142
— — See also *Power Plants; Substations*
— Supply, British Empire Exhibition, Blackstone Oil Engine, 638*
— — Electric, for Aden, 348, 487
— — Electric, Bergen and Christiania, 85
— — Electric, Birmingham Area, Mercury-Vapour Rectifier Substations, 783*, 845*
— — Electric, Continuity and Regularity, 112
— — Electric, Development of Industry, 617
— — Electric, and Industrial Decentralisation, 185
Power Supply, Electric, Melbourne, Excavating Machine for Brown Coal, 299*
— — Electric, by Railway Companies, 185
— — Electric, Regulations in Various Countries, 37
— — Electric, Schemes in Parliament, 777
— — Electric, Voltage Regulation in, 78
— — Electric, West Midlands District, 745
— Transmission, Electric, A Hundred Years' Progress, 193. See 266
— — Gears. See *Gears*
— — High-Tension Direct-Current, Transverter for, 14, 81
— — Lines, High-Tension in France, 78, 80
— — Renold Hollow-Stud Driving Chain, 260*
— — See also *Gearing; Marine Propulsion*
— Tidal, River Severn Scheme, Preliminary Enquiry, 294
— Water, Auxiliary Steam Plants, 42, 503
— — Canada, International Joint Commission, 37
— — Canada, Queenston-Chippawa Development, 220*, 255*. See 267
— — Canadian, Development of River St. Lawrence, 239*, 271*. See 267
— — Canadian, and the Electro-Metallurgical Industries, 449
— — Canadian Resources, 43, 137, 301, 506. See 267
— — Catchment Areas, Run-off, Storage and Allocation, 42
— — Ceylon, Aberdeen-Laxapana Scheme, 473*
— — Civil Engineering, 44
— — Control of Energy, 45
— — Dam Construction in Italy, 44
— — Design of Turbines, 63
— — Development in Dutch East Indies, 44
— — Development, Factors of Efficiency, 42
— — Development on Navigable Rivers, 43
— — Development in Spain, 43, 44
— — Development, Styria, 78
— — Electro-Chemical and Electro-Thermal Industries, 116
— — Experimental Research, 45
— — Flow of Spanish Rivers, 43
— — In France, 42
— — Ice Troubles, 45, 73, 241*, 463
— — Low Heads, Lawaczeck Turbines, 63, 434*, 851*
— — Low Head, Use of Transformer Weirs, 435*
— — Newfoundland, Use for Paper Manufacture, 125*
— — New Zealand, Development, 290
— — Production in Austria, 44
— — Production from Spanish Mountain Streams, 44
— — in Sweden, 43
— — Tirso Hydro-Electric Scheme, Sardinia, 632*
— — Turbine Design, American Practice, 71. See 45
— — Uniform Rules for Plant Testing, 51, 145
— — World's Resources, 18, 31
— — See also *Hydraulic; Power Plant, Hydro-Electric; Tidal Power; Turbines, Hydraulic*
— Wind, Calculations, and Meteorological Data, 77
— — Electric Power Generation, 77
— World, Economics of, 35
Prandtl Theory, Aviation, and the Flettner Rotor Ship, 710, 770. See LETTER 831*
Pratt & Whitney Co., Odontometer, Gear-Tooth Measurement, 822*
Precipitation, Electrical, Dust and Fog, 648. See LETTER, 676
Presidential Address, Institution of Automobile Engineers, by Dr. W. R. Ormandy on Research, 551
— — British Association, by Sir D. Bruce, on the Prevention of Disease, 265
— — British Association, Chemical Section, by Sir R. Robertson, on Chemistry and the State, 448
— — British Association, Engineering Section, by Prof. G. W. O. Howe, on a Hundred Years of Electrical Engineering, 193. See 266
— — British Association, Mathematical and Physical Science Section, by Sir W. H. Bragg, on the Analysis of Crystal Structure by X-Rays, 349*, 428. See 368
— — Institution of Civil Engineers, by B. Mott, on Metropolitan Engineering, 640. See 647, 676
— — Institution of Electrical Engineers, by W. B. Woodhouse, on Electricity Supply, 617
— — Liverpool Engineering Society, by R. E. Gibson, on Liverpool Gas Supply, 682
— — Institution of Mining Engineers, by Dr. J. S. Haldane, on the Industrial Machine, 585
— — Institution of Municipal and County Engineers, by G. F. Carter, on the Duties of Municipal Engineers, 24
— — North-East Coast Institution of Engineers and Shipbuilders, by T. Westgarth, on the Industrial Machine, 585
— — Institution of Public Lighting Engineers and Superintendents, by S. B. Langlands, on Street Lighting in Glasgow, 458
— — Radio Society of Great Britain, by Dr. W. H. Eccles, on Amateur Wireless Transmission, 456
— — Institute of Transport, by Sir L. Macassey, on the London Traffic Problem, 522
Prices of Metals. See *Metal-Price Diagrams*
Printing Machine, Wooden Boxes, 544*
Producers, Gas, Applications and Economic Features, 39. See 83
— — Engine. See *Engines, Gas*
— — Steel Castings for, 439*
— — Using Waste Wood, 39, 503
Progressive Feed Heating, Steam Turbines. See *Feed Water*
Projectile, 21-in. Capped Armour-Piercing, (Hadfields, Ltd.), 189*
Propellers, Aerial. See *Aeronautics*
— Marine, Cavitation Investigations, United States Warships, 717*. See LETTER, 769
— — Design, Influence of Aeronautics, 723

Propellers, Marine, Michell Thrust-Measuring Gear, 785*
— Model Experiments, Comparisons, 713
Propulsion of Ships. See *Marine Propulsion; Engines; Turbines; Propellers; Ship Resistance*
Props, Pit, Withdrawing Appliances, 528*
Protons, Ejection in Atomic Disintegration, 368
Psychrometry, National Physical Laboratory, 278*
Public Heath and the Engineer, 286
— Lighting Engineers and Superintendents, Institution of, Conference, 457
— — in Glasgow, 458
— Service by Engineers, 375
— — United States, Regulation, 37
— Works, Schemes in Parliament, 776
Pulaski, Ferro-Concrete Arch Bridge, Timber Centring, 257*
Pulleys, Belt, Lathe for Turning, 358*
Pullman Buffet Car, British Empire Exhibition, 7
Pulping Machines for Coffee Berries, 541*
Pulverised Coal, Boiler Firing and Metallurgical Furnaces, 39, 40, 198, 480, 592. See *Erratum*, 91
— — Lakeside Power Station, Handling Tests, 592
Pumps, Air, Contraflo Reciprocating, (Vickers, Ltd.), 573*
— — with Ejector Augmentor, Paragon (G. & J. Weir, Ltd.), 217
— — See also *Air Compressors*
— Centrifugal, Boiler-Feed, Geared-Turbine Drive (British Electric Plant Co., Ltd.), 626*
— — Boiler-Feed, Turbine-Driven (G. & J. Weir, Ltd.), 216*; Gwynnes Engineering Co., Ltd., 218*
— — Chester Waterworks, Remote Control, 671*
— — Electrically-Driven, Coal-Washing Plant (Gwynnes Engineering Co., Ltd.), 413*
— — Emergency Bilge (Gwynnes Engineering Co., Ltd.), 2*; (Drysdale & Co., Ltd.), 217*
— — Extraction, for Condensing Plant (Mirrlees, Watson & Co., Ltd.), 5*; (Drysdale & Co., Ltd.), 217*
— — Four-Stage, Fire Protection, (Worthington-Simpson, Ltd.), 153*
— — Four-Stage, High-Lift (Gwynnes Engineering Co., Ltd.), 2
— — Low-Lift, for Circulating Water (Mirrlees, Watson & Co., Ltd.), 5*
— — Low-Lift, Submerged, for Irrigation (Gwynnes Engineering Co., Ltd.), 3*
— — Multi-Stage, Electrically-Driven (Holden & Brooke, Ltd.), 159*
— — Oil, Turbine-Driven, Turbo-Generator Lubrication, 762*
— — and Petrol Engine, for Salvage Work (Drysdale & Co., Ltd.), 218*
— — Rees-Roturbo, Leyland Motor Fire Engine, 156; Stanley Motor Fire Engine, 386
— — Sewage, Gwynne-Pennell Rotary Trap, 218*
— — Single-Stage (British Electric Plant Co., Ltd.), 627*
— — Six-Stage, Electrically-Driven (British Electric Plant Co., Ltd.), 625*
— — Steam-Driven, Salvage Work, 531
— — (Tangyes, Ltd.), 5
— — Turbine-Driven, for Condensate, S.S. "Drottningholm," 841*
— — Turbine-Driven, Transformer Weirs, Utilisation of Low Heads, 435*
— — Two-Stage, Dennis Motor Fire Engine, 386*. See 426*
— — Two-Stage, High-Lift (Mirrlees, Watson & Co., Ltd.), 5*
— — Two-Stage, Trailer Fire Appliance (Gwynnes Engineering Co., Ltd.), 147*
— Feed-Water, for Locomotives, (Worthington-Simpson, Ltd.), 478*
— Fuel-Injection, Blackstone Oil Engine, 60*, 639*. See 21
— — Injection, Diesel Engines, Arschaouloff System, 29*
— — Injection, Gardner Oil Engine, 598*
— Horizontal Duplex, for Cargo Oil (Hayward-Tyler & Co., Ltd.), 5*
— — Duplex, with Twells Valve Gear (Hayward-Tyler & Co.. Ltd.), 3*
— — Three-Throw, for Sewage Sludge (Hollings & Guest, Ltd.), 211*
— Measuring, for Petrol, Canadian, 141*
— Mercury-Vapour, High Vacua, 267*
— Oil, Mechanical Lubricator for Locomotive, 163*
— and Pumping Machinery, British Empire Exhibition, 2*, 216*, 625*
— Reciprocating, Hatfield Type, Merryweather Motor Fire Engine, 156*. See 426*
— — Horizontal Three-Throw Type (F. Pearn & Co., Ltd.), 159*
— — Steam-Driven, Fire and Salvage Work, Merryweathers', 531*
— — Two-Throw, Electrically-Driven (G. & J. Weir, Ltd.), 216*
— Rotary, Fire Protection (Martin's Cultivator Co., Ltd.), 428*
— — Gear Type, for Oil Fuel (Hayward-Tyler & Co., Ltd.), 5
— Slime, Gold Mining, Robeson-Davidson, 174
— Vertical Duplex (Hayward-Tyler & Co., Ltd.), 5*
— — Duplex, for Oil Fuel (Worthington-Simpson, Ltd.), 856*
— — Duplex, Piston-Cooling, Diesel Engine (Hayward-Tyler & Co., Ltd.), 5*
— — Ram (Tangyes, Ltd.), 22*
Pumping Dredged Materials, Floating Pipe Lines, 438. See *Erratum*, 486
— Fuel Oil, Design of Pipe Lines, 792, 823*, 853*
— and Heating Unit, Wallsend-Howden Oil-Fuel System, 345*
— Machinery, Agricultural Show, Leicester, 22*
— — British Empire Exhibition, 2*, 216*, 265*
— Modern Theory and Practice (Review), 557
— Stations, Calcutta Water Supply, 178
Pumping Stations, Chester Waterworks, Remote Control, 671*
Puretha Respirators, Noxious Gases, 149*
Purification of Sewage. See *Sewage*
— of Water. See *Water*
Putter, Electric, Colliery Haulage, 252*
Pye, D. R., on Fuels for Internal-Combustion Engines, 616
Pyrometry, Furnace as Radiation Standard, 101
— Temperature Measurement and Fuel Economy, 40
— Thermo-Couples, Measurement of Gas Temperatures, 686

Q.

QUANTUM Theory and Scattering of X-Rays, 322
Quartz Lamp, Mercury-Vapour, Kinematography, 295*
— Lenses, Fused Silica, Ultra-Violet Light, 296
Queenston-Chippawa Hydro-Electric Development, 220*, 255*. See 267
Quenching of Steel. See *Heat Treatment* under *Metallurgy*
Quick-Firing Guns. See *Guns*
Quicksilver. See *Mercury; Metal-Price Diagrams*

R.

RADIAL Drill. See *Drill* under *Machine Tools*
Radiation, Critical Potentials in, 322
— Loss, Gas Engines, 605, 623*, 629*, 679, 684. See LETTERS, 641, 704, 746
— and Loss of Mass of Stars, 802
— Recorders, Solar, Comparisons, 182
— Secondary and Tertiary, X-Rays, 323
— Standard, Furnace as, 101
Radio Research Board, Report on Direction Finding, 866
— Society of Great Britain, Presidential Address by Dr. W. H. Eccles, on Amateur Wireless Transmission, 457
Radiotelegraphy. See *Telegraphy, Wireless*
Radiotelephony. See *Telephony, Wireless*
Rail Joint, Irish Bascule Bridge, 759*
— Steel, British Empire Exhibition, 438, 440
— — Prices. See *Metal-Price Diagrams*
Railless Electric Traction, Schemes in Parliament, 777
— — Vehicles, Characteristics and Uses, 688*, 719
Railodok Electric Passenger Cars, British Empire Exhibition, 198
Railroad, Chesapeake and Ohio, Mallet Simple Locomotive, 795*, 860*
— See also *Railways*
Railway Accidents. See *Accidents*
— Buenos Ayres Great Southern, Locomotive, 280*
— Bengal-Nagpur, Hopper Coal Wagon, 279*
— Bridge. See *Bridge*
— British, Labour Statistics, 524
— — Report on Accidents, 484
— Canadian, British Empire Exhibition, 141*. See 266, 540
— Carriage. See *Carriage*
— City and South London, Tunnel Enlargement, 640; Reopening, 775
— Companies, Electric Power Supply by, 185
— Competition with Coastal Shipping, 774
— Coupling, Automatic, Willison Central-Buffer Type, 478
— Egyptian State, Royal Saloon Coach, 475*
— Electric, Recording Instruments for Dynamometer Cars, 208*
— Electrification, Austria, 117
— — British Main Lines, 118, 456
— — Dutch East Indies, 118
— — Financial Aspects, 117
— — Germany, 118
— — Hungary, Three-Phase Variable-Voltage System, 118
— — Norway and Sweden, 118
— Federated Malay States, Penang Hills Railway, 664*, 726*, 789*, 852*
— French African Colonies, Need for Development, 674
— Funicular, Penang Hills, 664*, 726*, 789*, 852*
— Hendon-Edgware Extension, Automatic Substation, 227*; Opening, 260
— Indian, British Empire Exhibition, 508
— Japanese, Train-Ferry Steamer "Shoho Maru," 735*
— Jersey, Steam Motor Coach, 6*. See *Errata*, 133
— Locomotive. See *Locomotive*
— London Midland & Scottish, Third-Class Vestibule Carriage, 160*; Transport of Turbo-Alternator Stator, 370; Transport of Large Cupolas, 592*
— London & North Eastern, Electrically Equipped Kitchen Car, 480; Double Bolster Carriage Bogie, 280*
— Material, British Empire Exhibition, 6*, 160*, 279*, 475
— — Turkish Market, 680
— Metropolitan, Control Trailer Car, 9*
— Motor Carriage. See *Carriage*
— Norwegian, Petrol-Driven Repair Car, 817*
— Points and Crossings, Planing Machine, 688*
— Rolling Stock. See *Carriages; Locomotives; Wagons*
— Schemes in Parliament, 776
— Signalling See *Signalling*
— South African, Development, 450; Refrigerator Cars, Fruit Transport, 743*
— Street. See *Tramways*
— Transport in Canada, 266, 540. See 141*
— — Large Cupolas, 592*
— — Turbo-Alternator Stator, 370
— Tube. See *Underground*
— Underground. See *Underground*
— Wagons. See *Wagons*
— Wheel, Rubber-Supported Steel Tyre, 9*
— — Tyres and Axles, British Empire Exhibition, 99, 438, 439
— Work, Rubber Applications in, 9*
— See also *Railroads* and PARAGRAPH INDEX
Rainham Creek, Sewage Disposal Works, 518
Ramsay Chemical Engineering Laboratory, University College, 682
Ransomes, Sims & Jefferies, Ltd., Cultivating Machine for Grass, 807
Rapidor Hack-Sawing Machine, 319*; Saw-Blade Sharpening Machine, 405*
Rare Elements, Chemistry of (Review), 336
Rays, Electric. See *Gamma Rays; Röntgen Rays*
Reactions, Chemical. See *Chemistry*
Read, Sir A., on Coastal Shipping, 774
Reaping and Threshing Machine, Combined, the Sunshine, 383
Recorder, Water, Vee Notch, Lea Closed-in Type, 598*
Recording Dynamometer. See *Dynamometer*
— Instruments, Cambridge, British Association Meeting, 287
— — Electric, Railway Dynamometer Cars, 208*
— — Planimeter for Averaging Charts, 207*
— Power-Factor Meter, 207*
Records Bureau, Co-ordination of Industrial Research, 586
Rectifier, Alternating Current, the Transverter, 14, 81
— Mercury-Vapour, Automatic and Semi-Automatic Substations, 782*, 845*
Rectifying Valves, High-Tension Currents, 492*
Redman, C., & Sons, Ltd., General Purpose Lathe, 310*; Planing Machines, 687*
Reduction Gears. See *Gears; Marine Propulsion; Motor-Car Details*
Rees, F. B., on Transportation in South Africa, 450
Rees, W. J., on the Effect of Exposure on Fireclay, 481: on Alumina-Silica Materials in Firebricks, 481: on the Storage of Silica Refractories, 481; on the Determination of Specific Gravity of Firebricks, 482; on the Specific Gravity and After Expansion of Lime-Bonded Silica Bricks, 482
Rees-Roturbo Pump, Motor Fire Engines, 156, 386
Refractive Index and Crystal Structure, Relationship, 368
Refractory Materials, Gas Works, 23
— — Firebrick, Determination of Specific Gravity, 482
— — Firebricks, Alumina-Silica Materials, 481
— — Fireclay, Effect of Exposure, 481
— — Fireclay, Effect of Sillimanite, 461
— — Section, Ceramic Society. See *Ceramic*
— — Silica Bricks, 708
— — Silica Bricks, Specific Gravity and After Expansion, 482
— — Silica, Storage of, 481
— — See also *Firebricks; Fireclays*
Refrigerating Machinery, Brewers' Exhibition, 649
— — British Empire Exhibition, 559*, 594*
— — New Zealand Pavilion, British Empire Exhibition, 290*. See 561*
— — Smithfield Show, 807
— Plants, Ammonia and Carbon Dioxide, Marine Service, 562*, 594*
— — Ammonia Compressors, High Speed, 561*, 594*
— — Ammonia, Small Capacity, for Butchers, &c., 561*
— — Canadian, British Empire Exhibition, 138*
— — Carbon-Dioxide Compressor, High-Speed, 559*
— — Carbon Dioxide, with Liquid Precooler, 559*
— — South African, 173*
Refrigeration, Cold Stores, Conductivity Tests of Insulating Materials, 742*
— Fruit Transport, Rail and Sea, 743*
— Heat-Insulating Materials, Research on Spongy Rubber, 682
— Research, Recent Developments, 742*
— See also *Cold Storage*
Refrigerator Cars, Fruit Transport, South African Railways, 743*
— Ships, Design and Construction, 713
Refuse Collection, Pagefield System, 655*
Regenerative Feed Heating. See *Feed Water*
— Furnace. See *Furnace*
— System, Gas Manufacture, 23
Regulations, Accident Prevention, Shipbuilding Work, 333
— Electrical Equipment of Buildings, 202
— Electric Power Supply, 37
— Home Office, Lead Poisoning, Accumulator Factories, 753
— Life Saving Appliances, Shipping, 587
— Whitworth Scholarships, 233
Regulators, Induction (Switchgear & Cowans, Ltd.), 181*
Reheating Furnace. See *Furnace*
— Steam. See *Turbines, Steam*
Reid-MacLeod Geared Turbine Locomotive, 479*
Rein-Drive Agricultural Tractor, 20, 59*
Reinforced Concrete. See *Ferro-Concrete*
Relativity, Einstein's Theory, 535
— in Wages, 489
Relay System, Automatic Telephone Exchanges, Chatham Dockyard and Hospital, 373
Relieving Lathe. See *Lathe* under *Machine Tools*
Remote Control, Pumping Station, Chester Waterworks, 671*
Remuneration of Labour. See *Labour*
Rendel, Palmer & Tritton, Stress Measurements, Westminster Bridge, 296
Renold, H., Ltd., Hollow-Stud Driving Chain, 260*
Rensselaer Polytechnic Institute, Centenary, 618
Repair Car, Railway, Petrol, Four-Wheel Drive, 817*
— Work, Commercial Motor Vehicles, 712
— — French Cast-Iron Arch Bridge, 557
— — Ships, Prevention of Accidents, 333
— — Turbines of S.S. "Mauretania," 424*
Reparations, German, Dawes Plan, and British Engineering Industry, 695, 725, 757
Repeated-Bending Tests, Wires and Wire Ropes, 856*, 867
— Stresses. See *Alternating Stress* under *Tests (Materials)*
Report, Accidents on British Railways, 484
— — Prevention, Shipbuilding Work, 333
Report, Alkali Works, 1923, 127
— Civil Aviation, 231
— Coal and Power, 293
— Complex-Stress Committee, British Association, 286. See 506
— Corrosion Research, Institute of Metals, 378
— Deterioration of Structures in Sea Water, 774
— Diesel Engines, Working Costs, 715
— Economic Conditions, Turkey and Colombia, 680
— Egyptian Economic and Financial Situation, 586
— Empire Motor-Fuels Committee, 616
— Food-Investigation Board, Heat-Insulating Materials, 682
— French Coast-Defence Measures, 170
— French Economic Conditions, 332
— Fuel Research Board, Parker Carbonisation Plant, 588*
— Home Office, Factory and Workshop Accidents, 773
— Indian Institute of Science, 674
— Lloyd's Register of Shipping, 656
— Machinery Failures, 417. See LETTERS, 486, 548
— Marine Oil Engine Trials Committee, 730, 750*, 784*, 798
— National Physical Laboratory, Work of, 5, 100*. See 334
— Panama Canal, 491, 745
— Port of London, 554
— Power Generation, Electricity Commissioners, 377
— Properties of Manganese Steel, 411
— Railway Employees, Ministry of Transport, 524
— Research Work, Marine Piling, United States (Review), 589
— Safety Precautions, Power Presses, 18
— Scientific and Industrial Research, 522, 586
— Sydney Harbour Bridge Designs, 129*, 169. See LETTER, 198*
— Trade of Dutch East Indies, 832
— Trade of Lithuania, 268
— Wire Ropes Research, 856*, 867
— Wireless Direction Finding, 866
— Work of Froude National Tank, 334
— See also *Board of Trade*
"Repulse," H.M.S., Model, British Empire Exhibition, 189
Research, Architectural Acoustics, 411
— Association, Cast Iron, British, 707
— Board, Fuel, Work of, 523; Coal Survey and Low-Temperature Carbonisation, 232. See 19, 31, 552; Carbonisation of Seaweed, 233: Investigation of Arley Coal Seam, 552: Trials of Parker Low-Temperature Carbonisation Plant, 588*
— — Industrial Fatigue, Statistical Investigation of Factory Accidents, 709. See 701, 746, 810
— — Radio, Report on Direction Finding, 866
— — Committee, Aeronautical, Work of Fatigue Panel, 245. See 284
— — Ferrous Alloys, Work of, 366
— — Corrosion, Institute of Metals, Report, 378
— — Department, Woolwich, Mercury-Vapour Pump, 267*: Extrusion of Brass Rod by Inverted Process, 387*. See 379, 415: Effect of Cold Rolling on Hardness of Copper, 386*. See 408; Report on Manganese Steel, 411.
— Food Investigation Board, Heat-Insulating Materials, 682.
— Indian Institute of Science, Report, 674
— Industrial, British and Foreign, 115
— — Fatigue, Application of Results, 202
— Laboratory, Birmingham Gas Department, Industrial Kinematography, 295*
— — Henley's Cable Works, 736*
— Low-Temperature, Toronto University, 367
— Non-Ferrous Metals, 335
— Refrigeration, Recent Developments, 742*
— Scientific, French Navy, 854
— — and Industrial, Department of, Investigation of Severn Power Scheme, 294
— — and Industrial, Character and Value, 551
— — and Industrial, Co-ordination, Records Bureau, 586
— — and Industrial, Report on, 522, 586
— Wire Ropes, Report, 856*, 867
— Work, Electric Cables, 81. See 736*
— — Marine Piling, United States (Review), 589
— — Rubber Plantations, 848
— — in Water Power, 45
— See also *National Physical Laboratory*
Reservoir, Cray, Swansea Water Works, Jet Dispersers for Water Discharge, 247*
— Waldeck, Temperature Fluctuations in Dam, 425
Resistance, Electric. See *Electric*
— of Ships. See *Ship Resistance*
— Welding. See *Welding*
Respirators, Puretha, Noxious Gases, 149*
Restaurant Cars, Electrically-Equipped Kitchen Car, L. & N. E. Railway, 480*
Retaining Walls for Reclaimed Land, 438. See *Erratum*, 486
Retorts, Vertical, Gas Manufacture, with Waste-Heat Boilers, 23
Reversing Clutch, Wiberg, Geared Turbines, 120, 144*
Reviews. See LITERATURE INDEX
Reyrolle, A., & Co., Ltd., Automatic Substation Equipment, 323*
Rheolaveur Coal-Washing Plant, Britis Empire Exhibition Colliery, 411*
Rhodesia, Use of Electric Power, 85
Ricardo, H., on Fuels for Internal-Combustion Engines, 616
Rice Mill Machinery, British Empire Exhibition, 537*
Richards, G., & Co., Ltd., Facing, Boring, Milling, Drilling and Tapping Machine, Pearn-Richards, 314; Vertical Boring and Turning Mill, 397*; Side Planing Machine, 770*
Richardson, Tuer & Co., Ltd., Cotton Weaving Machinery, 248*
Richardsons, Westgarth & Co., Ltd., Steam Turbine, Manchester Power Station, Tests, 668; Diesel Engines, M.S. "Sycamore," Report on Trials, 730, 750*, 784*, 798

Ricks, Hay and Corn, Drying by Hot Air, 554*
Rickwood, H. A., on Ferro-Concrete Cooling Towers, 776
Riddlesworth, W. H., on a Displacement-Draught Formula, 26
Ridsdale & Co., Standard Specimens, Steel Analysis, 439.
Rigid Airships. See *Airships* under *Aeronautics*
Rims, Pneumatic Tyres, Standard Specifications, 261
Ring Doubling Frame for Cotton, 91*
— Piston, See *Piston Rings*
— Valves, High-Speed Ammonia Compressors, 561*, 594*
River Bann, Ireland, Bascule Bridge, 758*
— Danube, Water Leakage from, 580
— Hospital Steamers, Conversion for Tourist Service, 463*
— Mersey, Proposed Tunnel under, 461
— Navigable, and Water-Power Development, 43
— St. Lawrence, Development for Power and Navigation, 239*, 271*. See 267; Dredging Work, 438. See *Erratum*, 486
— Seine Regulation Works, 682*
— Severn Tidal Power Scheme, Preliminary Enquiry, 294
— Spanish, Flow of, 43
— Tirso Hydro-Electric Scheme, Sardinia, 632*
Rivet Heater, Electric (A.1. Electric Welding Appliances Co.), 828*
Road Conditions, Influence on Motor Vehicle Development, 87, 874*
— Construction, Schemes in Parliament, 777
— — Modern Practice, 692
— — and Motor Transport, 24
— Engineering, Treatise on (Review), 524
— Illumination and Motor-Car Traffic, 260. See 458
— Improvements, Greater London, 571*
— Locomotives. See *Motor; Tractor*
— Reconstruction in Durham, 24
— Roller, Motor, 12-ton Water Ballast (Barford and Perkins, Ltd.), 59*
— — Steam, Marshall's, 60
— Traffic, Census of, 837
— — Congestion, London, Causes and Remedies, 651. See 522, 640, 647
— Traction, Railless Electric. See *Railless*
— Transport, Early History, 681
— — and London Traffic Problem, 522. See 640, 647
— — Maintenance of Commercial Vehicles, 712
— — Mechanical, Development, 85
— — Mechanical, Treatise on (Review), 809
— — Turbo-Alternator Stator, 370, 552
— Vehicles, Electric. See *Motor Vehicles*
Roadless Tractor. See *Tractor*
Robertson, F., the Late, 653
Robertson, Sir R., on Chemistry and the State, 448
Robeson-Davidson Slime Pump, 174
Robey & Co., Ltd., Electric Haulage Engine, Penang Hills Railway, 789*. See 852*
Robins Belt Conveyor for Coke, 512*
Robinson, T., & Sons, Ltd., Mortising and Tenoning Machines, 297*
Rock Drill, Climax Percussion Type, 528*
— — (Delfos, Ltd.), 174*
— Igneous, Formation of, 588
Rockford Tool Company, Sundstrand Stub Lathe, 357*
Rod, Brass, Extrusion, Inverted Process, 387*. See 379, 415
Rogers, Dr. F., Microscopes for Metallography, 514*
Rogers, G., on Mercury-Vapour Substations, 782*, 845*
Roll-Grinding Attachment, Surface Grinding Machine, 404*
Rolled Steel Plates and Sections, British Empire Exhibition, 439, 440
— — Sections, Hack Sawing Machines for, 320*, 445*
Roller Bearings. See *Bearings*
— Road. See *Road Roller*
Rolling Mills, Cold, Design of Bearings, 569*, 601*, 636*. See LETTER, 760*
— — Cold, Michell Radial Bearings, 769*
— — Sheet, Ilgner Electric Drive, 842*
— Stock. See *Carriages; Locomotives; Wagons*
Rolls-Royce, Ltd., 20-h.p. Motor Car, 575*
Romford Sewage Disposal Works, Rainham Creek, 518
Röntgen Rays, Analysis of Crystal Structure, 349*, 368, 428
— — National Physical Laboratory Work, 6
— — Production by Photo-Electrons, 323
— — Scattering of, 322
— — Secondary and Tertiary Radiations, 323
Roof Trusses, Use of Tubular Members, 674*. See 716
Roofing Material, Fireproof Bitumen, Tests, 166
Rooney, T. E., on Estimation of Oxygen in Iron, 366
Ropes, Wire. See *Wire Ropes*
Rose, Sir T. K., on Nickel for Coinage, 378
Rosenhain, Dr. W., on Hardening of Steel, 391*; on Light Alloys, 455
Ross, Sir A. C., on Marine Propulsion, 25
Rossell, Commander H. E., on Scrapping Warships, 714
Rotary Converter, Automatic Starting and Control Gear, 13*, 227*
— Engine. See *Engine; Aeronautics*
— Pump. See *Pump*
— Synchroniser, Switchboard, 107
— Trap, Gwynne-Pennell, Centrifugal Sewage Pumps, 218*
Rotating Discs, Conical Profile, Stresses in, 418. See LETTER, 486
Rotor, Hydraulic Turbines (Vickers, Ltd.), 100*
— Shafts, Turbo-Generator, Failures of, 418
— Ship, Flettner, Theory of, 710, 770. See LETTER, 831*
Rotoscope, Investigation of Moving Machinery, 236
Roturbo Pump, Motor Fire Engines, 156, 386
Rover Motor Cycle, 652*
Rowe, F. W., on the Effect of Casting Temperature and Heat Treatment on Properties of Bronze, 430*. See 409; on Influence of Casting Temperature and Mass on Properties of Gun Metal, 436*. See 409
Rowe, G., the Late, 462
Royal Aeronautical Society. See *Aeronautical*
— Agricultural Hall. See *Exhibition*
— Agricultural Society. See *Agricultural*
— Danish Dockyard, Copenhagen, Cable Steamer "Edouard Suenson," 196*, 269*
— Meteorological Society. See *Meteorological*
— National Life-Boat Institution, Centenary, 16. See *Erratum*, 207
— Saloon, Egyptian State Railways, 475*
— Society, Kelvin Centenary Celebrations, 97. See 104
— — of Arts. See *Arts*
Royalties, Mining, and Cost of Coal, 294
Rubber Applications in Railway Work, 9*
— Industry, Institution of, Prof G. S. Whitby on Acidity of Raw Rubber, 334; E. Anderson on Sulphur, 566; C. W. H. Howson on Gutta Percha, 676; Dr. A. van Rossem on the Chemistry and Uses of Rubber Latex, 776; Major B. J. Eaton on Research Work on Rubber Plantations, 848
— Latex, Industrial Applications, 776
— Manufacture, Experimental Laboratory, Henley's Cable Works, 738*
— Plantations, Research Work on, 848
— Raw, Acidity of, 334
— Spongy, Heat-Insulating Material, Research, 682
— Sulphur in, 566
— Tyres, Road Vehicles, Early Use, 681
Rudder Frame, H.M.S. "Hood," Steel Casting, 189*
Rules, Accident Prevention, Shipbuilding Work, 333
— Electrical Equipment of Buildings, 202
— Home Office, Lead Poisoning, Accumulator Factories, 753
— Life-Saving Appliances, Merchant Ships, 587
— Shipbuilding, British Corporation, 738
— Testing Water Power Plants, 51, 145
Rung, W., on Electric Power Transmission, Norway to Denmark, 114. See 78
Russell, J., & Co., Exhibits at British Empire Exhibition, 439
Russia, Fuel and Power Resources, 32, 82. See 19
— Poulkovo Observatory, Solar Spectrograph, 87*
— Soviet Government Patent Laws, 554
— — Naval Construction Programme, 651
Rusting. See *Corrosion*
Ruston & Hornsby, Ltd., Electrically-Operated Excavating Machine, 299*
Ruths, A., on Ice Troubles, Norwegian Water Power Plants, 73
Ruths, Dr. J., on Steam Accumulators, 68*
Ryder, T., & Son, Ltd., Automatic Machine for Chucking Work, 399*; Swaging Machine, 407*

S.

SADLER, Prof. H. C., on Self-Unloading Cargo Vessels, 723*. See *Erratum*, 863
"Safaja," Motor Tug for Egypt, 517*
Safety Lamps, Caeg Electric, for Miners, 529
— — Electric, Turbine-Driven Generator, 530*
— of Life at Sea. See *Life-Saving*
— Precautions, Power Presses, 18
Saint. See *St.*
Salmon River, Ferro-Concrete Arch Bridge, Timber Centring for, 257*
Saloon Coach, Royal, Egyptian State Railways, 475*
Salt, Effect on Concrete, 618
Salts, Crystallisation from Solutions, 738
Saltcake, Corrosion of Fireclay by, Glass Furnaces, 786
Salvage Operations, Use of Submarine-Testing Dock for, 233*. See 373
— German Fleet, Scapa Flow, 233*. See 373
— Pump, Petrol-Driven, Drysdale, 218*
— Work, Merryweather's Pumps for, 531*
Samsioe, A. F., on Ice Troubles, Swedish Water-Power Plants, 45, 463
Sandpapering Machine (Wadkin & Co.), 23*
Sandstorms, Sudanese Haboobs, 592
Sanitation, Engineers and Public Health, 286
— Refuse Collection, Pagefield System, 655*
Sankey, Capt. H. R., on the Engine and Boiler Trials Committee, 55. See LETTERS, 101; on Standards of Comparison, Efficiency of Steam Engines, 818*. See 835, 866*
Santa Chiara di Ula Dam, Sardinia, 632*
Sardinia, Tirso Hydro-Electric Scheme, 632*
Saurer Gear-Testing Machine, 821*
Sawmills, Drying Towers for Wood Waste, 39, 503
Saws. See *Machine Tools*
Scapa Flow, Salvage of German Fleet, 233*. See 373
Scholarships. See *Education*
Scholes, Prof. G. E., on a Modified Temperature-Entropy Diagram, 215*
Schoop Process, Metal-Spraying, 409
Science, Indian Institute, Report, 674
— Medical, and the Prevention of Disease, 265
— Teaching in Technical Schools, 865
Scientific Instruments, British Empire Exhibition, 129*, 278*
— Management. See *Works Management*
— Methods and Industrial Economics, 865
— Research. See *Research*
— Societies. See *Institutions*
Scoble, Dr. W. A., Report on Wire Ropes Research Committee, 856*. See 867
Scotland, Institution of Engineers and Shipbuilders in. See *Engineers*
Scott & Hodgson, Ltd., Heavy Rolling-Mill Drives, 842*
Scrap, Iron and Steel, Classification of, 806
Screening Plant, Coal, British Empire Exhibition Colliery, 340*
Screens, Electrically-Heated, Ice Prevention Water Power Plants, 74
Screw-Cutting Lathe. See *Lathe* under *Machine Tools*
— Propellers. See *Propellers; Aeronautics*
Screw Thread Grinding Machine, 547*
Screwing Machine. See *Machine Tools*
Scutcher and Lap Machine for Cotton, 13*
Sea Transport, Power for, 118
— Water, Corrosion of Iron and Steel in, 775
— — Corrosion of Condenser Tubes, 378
— — Deterioration and Preservation of Structures in (Review), 589; Report on, 774
Seam-Welding Machine (A.1. Electric Welding Appliances Co.), 827*
Seaplanes, See *Aeronautics*
Seasled Type Motor Boat, 460*
Seaweed, Carbonisation of, Fuel-Research Board, 233
Sechi, G., on Submarine Design, 232
Secondary Battery. See *Accumulator* under *Electric*; also *Motor Vehicles*
— Schools and Education. See *Education*
Sections, Structural Steel, Hack-Sawing Machines for, 320*, 445*
"Seekonk," S.S., Conversion to Motor Ship, 714
Seine, River, Regulation Works, 682*
Seismographs, Milne-Shaw, Correlation of Records, 410
Seismological Investigations, Report on, 410
Selenium Colourless Glass, Effect of Arsenious Oxide, 786
Selson Engineering Co., Ltd., Lathes, 310*, 357*; Shaping Machine, 359*; Forging and Upsetting Machine, 407*
Semenza, Dr. G., on Continuity of Operation, Electric Systems, 112
Semet-Solvay and Piette Coke Oven Co., Ltd., Coke Ovens, 510*
Semi-Portable Engine. See *Engine*
Sensitive Drill. See *Drill* under *Machine Tools*
Sentinel Waggon Works, Ltd., Portable Steam Engine and Agricultural Tractor, 21*. See 807; Steam Railway Motor Coach, 6*. See *Errata*, 133; Roadless Tractor, 717*
Separating Plant, Palm Kernels, 513*
Separator, Centrifugal, for Oil, Monarch, 274*
Settlements, Foundation, London Bridges, 641. See 102, 647, 676, 807
Severn Tidal Power Scheme, Preliminary Enquiry, 294
Sewage Disposal Works, Rainham Creek, for Romford, 518
— — Works, Sheffield, 24
— Pumps, Centrifugal, Gwynne-Pennell Rotary Trap, 218*
— Purification, Bio-Aeration in, 241. See 286
— Sludge, Horizontal Three-throw Pump, 211*
— See also PARAGRAPH INDEX
Shaft Coupling. See *Coupling*
— Crank. See *Crankshaft*
— Deep, Sir C. A. Parsons' Suggested, 548
— and Holes, Fitting of. See *Gauging*
— Rotor, Turbo-Generators, Failures of, 418
Shaker Conveyors for Colliery Workings, 226*
Shale Oil Distilling Plant, Crozier System, 538*
— — Somerset and Welsh, Properties and Uses, 777
— Swedish, Oil Production Plant, 39
Shallow-Draught Motor Ship "Nabha," Hospital Service, 421*
— — Gunboats, Yarrow, 459. See LETTER, 486
— — Steamers, Propulsion, Yarrow Flap System, 459. See LETTER, 486
Shamva Gold Mine, South Africa, Method of Working, 204*
Shanks, T., & Co., Ltd., Planing-Machine Drive, 363
Shaping Machine. See *Machine Tools*
Shatwell, H. G., on Fuel Oil Resources and Somerset Oil Shales, 777
Shaw, J. C., Conversion of Steamer to Motor Ship, 714
Shear Stresses in Tapered Girders, 789*
Sheet Piling, Dam, Gladstone Dock Construction, 48*
— Rolling Mills, Ilgner Electric Drive, 842*
Sheets, Galvanised Iron, Testing, 825*
Sheffield, Cutlers' Feast, J. H. Thomas on Class Warfare, 681. See LETTER 746
— Sewage Disposal Works, 24
Shells. See *Projectiles*
Shelton Iron Works, Coke Oven Plant, 510*
"Shenandoah," U.S. Airship, Operations, 489
Sherardising Process, Inception and Development, 277*
Ship Canal. See *Canal; Navigation, Inland*
— under Construction, Lloyd's Statistics, 52, 516
— Cost of Speed, 119
— Design, Influence of Aeronautics, 722. See 713
— — Bow Construction for Collision, 618
— — Co-operation between Shipowners and Shipbuilders, 119
— Diesel-Engined. See *Motor Ships; Marine Propulsion*
— Displacement and Draught, Formula Connecting, 26
— Dutch, Propelling Machinery, 119
— Electric Propulsion. See *Marine Propulsion*
— Flettner Rotor, Theory of, 710, 770. See LETTER 831*
— Hospital, Conversion for Nile Tourist Service, 463*
— Japanese, Load Line Regulations, 113
— Laid-up Tonnage, 660
— Merchant, Life-Saving Appliances, New Regulations, 587
— — Lloyd's Register Book, 166
— — Losses of, Lloyd's Statistics, 166, 267, 519, 820
— — of the World, Tonnage Owned, 98
— Model Experiments. See *Ship Resistance*
— Motor. See *Motor Ships; Marine Propulsion*
— Propellers. See *Propellers*
— Propulsion. See *Marine Propulsion; Engines; Turbines; Propellers*
— Refrigerator, Design and Construction, 713
— — Fruit Transport, 743*
— Resistance, Model Experiments, Work of Froude Tank, 334
— — and Power for Propulsion, 119
— Salvage of. See *Salvage*
— Swedish, Propelling Machinery, 148. See 120
— Winches, Electric, Austin Constant-Current System, 734*
Ship. See also *Marine; Motor Ships: Shipping; Steamers; Warships* and PARAGRAPH INDEX
Shipbreaking Methods, U.S Warships, 714
Shipbuilders and Engineers, North-East Coast Institution of. See *North-East Coast*
— — in Scotland, Institution of. See *Engineers*
— and Shipowners, Co-operation between, 119
Shipbuilding, Bow Construction for Collision, 618
— Industry, Wages in, 265
— Naval. See *Warships*
— Report of Lloyd's Register, 656
— Rules and Tables, British Corporation, 738
— Vessels under Construction, Lloyd's Statistics, 52, 516
— Work Prevention of Accidents, Report, 333
— See also *Steamers; Naval; Warships;* and PARAGRAPH INDEX
Shipowners, Co-operation with Shipbuilders, 119
Shipping Annual, Brassey's (Review), 809
— Board, United States, Steamers, Fuel Conservation and Performance Standards, 714
— Coastal, Position and Prospects, 774
— Committee, Imperial, Depth of Colombo Harbour, 457
— under Construction, Lloyd's Statistics, 52, 516
— Draught of, Deepening of Colombo Harbour, 457
— Industry, Present Position, 265
— Laid-up Tonnage, 660
— Losses, Lloyd's Statistics, 166, 267, 519, 820
— Merchant, Life-Saving Appliances, New Regulations, 587
— — Lloyd's Register Book, 166
— — in Naval Warfare, Italian Manœuvres, 806
— — Position and Prospects, Report of Lloyd's Register, 656
— — of the World, Tonnage Owned, 98
— Navigation Improvements, River St. Lawrence, 239*, 271*. See 267
— Panama Canal, Report, 745. See 491
— Port Facilities, Great Britain, Report, 715
— — of London, Statistics, 554
— Traffic on Great Lakes, 266
Shipyards, Prevention of Accidents, Report, 333
Shock Tests. See *Impact Tests* under *Tests (Materials)*
"Shoho Maru," Japanese Train-Ferry Steamer, 735*
Shop Management. See *Works Management*
Shovel, Steam. See *Excavating Machine*
Show. See *Exhibition*
Shunting Locomotive. See *Locomotive*
Siberia, Power Resources, 33. See 19
Side Planing Machine. See *Machine Tools*
Siebe, Gorman & Co., Ltd., Respirators and Self-contained Diving Dress, 149*
Siemens-Martin Furnaces. See *Furnaces*
Sieve, Rotary, Grading Coffee Berries, 542*
Signalling Apparatus, Electrical, in Mines, Gas Ignition by, 243
— — Penang Hills Funicular Railway, 853*
— Railway Long-Burning Oil Lamp, 9
— — Roller Bearings, Ground Connections, 9
— — Tyer Key-Token Instrument for Single Line Working, 10*
— — Tyer One Wire, Three Indication Block Instrument 10*
— — Westinghouse Double-Wire Operating System, 163*
Signals, Coloured, Street-Traffic Regulation, 24
Silica Bricks. See *Firebricks*
— Electric Furnace for Fusing, 848
— Fused, Mercury-Vapour Lamp, Kinematography, 295*
— Lenses, Ultra-Violet Light, 296
— Refractories, Storage of, 481
Sillimanite, Effect on Fireclay, 461
"Silurian," M.S., Trials, 643
Silver Solder, Standard Specifications, 261
— Tensile Strength, Temperature and Cold Work, Relationship, 408
Simon, H., Ltd., Paddy Eliminator, 537*
Simons, Wm. & Co., Ltd., Naval Exhibits, British Empire Exhibition, 460
Single-Phase. See *Generator; Motor; Locomotive; Power; Railway*
Sirius Turbine Pump, 159*
Sirocco Mine Ventilating Fan, 160*
Siskin Aeroplane, 870*
Siskol Coal-Cutting Machine, 225*
Skies and Clouds, Photometric Observations, 592
Skin Friction in Aeronautics, Theory of, 742. See LETTER 831*
Slag Wool, Thermal Conductivity, Effect of Packing, 743*
— See *Metallurgy*
Slime Pump, Robeson-Davidson, 174
Slot-Drilling Machine. See *Machine Tools*
Slotting Machines. See *Machine Tools*
Sloops. See *Warships*
Sludge. See *Sewage*
Sluice, Automatic Control of Opening, 432*
— Gates, Automatic, Spillway, Tirso Dam, 635*
— Valves, Queenston-Chippawa Hydro-Electric Development, 223*
Smelting Furnaces. See *Furnaces*
Smith, P. H., on Exhaust Temperatures, Diesel Engines, 544*
Smith & Coventry, Ltd., Multiple Sensitive Drilling Machine, 358*; Boring Mill, 398*; Worm-Gear Generator, 401*; Slot-Drilling and Key-Seating Machine, 405*
Smithers, Sir A. W., the Late, 291
Smithfield Agricultural Show, 807
Smoke, Electrical Precipitation, 648. See LETTER, 676
Smokeless Fuel. See *Coal, Low-Temperature Carbonisation*
Snow & Co., Ltd., Grinding Machines, 403*
Soap, Chemistry of, British Association Papers, 480
— Manufacture, Treatise on (Review), 189
Social Aspect, Power Production, 36, 37
— Reactions of Cheap Power, 185
Socialism and Class Warfare, 681. See LETTER, 746

Societa Ansaldo San Giorgio, Submarines, 171
Societies, Technical and Scientific. See *Institutions*
Society of Motor Manufacturers and Traders. See *Motor*
— Trade. See *Labour*
Sodium, Determination in Aluminium, 409
Solar Activity and Terrestrial Magnetism, 410
— Radiation Recorders, Comparisons, 182
— Spectrograph, Poulkovo Observatory, 87*
— See also *Sun*
Solder, Silver, Standard Specifications, 261
Solutions, Chemical Salts, Crystallisation from, 738
Somerset Oil Shales, Properties and Uses, 777
Sound, Electrical Production of Vowel, 828
— Nature of Speech, 411
— Research in Architectural Acoustics, 411
— Work of National Physical Laboratory, 6
South Africa, Durban, Electric Crane for Congella Dock, 104*. See 238
— — Irrigation Engineering (Review), 631
— — Power Production and Distribution, 35. See 19, 31, 85
— — Power Resources, 31. See 19, 35, 85
— — Rhodesia, Use of Electric Power, 85
— African Exhibit, British Empire Exhibition, 172*, 204*
— — Railways, Development, 450
— — Railways, Refrigerator Cars, Fruit Transport, 743*
— Metropolitan Gas Company, Removal of Carbon Monoxide from Gas, 23
— Wales Institute of Engineers, Cardiff Engineering Exhibition, 747, 766*, 808
— West, Notes from, 15, 53, 95, 133, 167, 199, 229, 261, 291, 329, 372, 415, 453, 487, 519, 549, 583, 613, 645, 677, 707, 739, 772, 803, 833, 863. See PARAGRAPH INDEX
— Yorkshire, Notes from, 14, 53, 95, 133, 167, 199, 229, 261, 291, 329, 373, 414, 453, 487, 518, 548, 582, 613, 644, 676, 706, 738, 771, 802, 832, 863. See PARAGRAPH INDEX
Southwark Bridge, Foundation Settlements, 641. See 102, 647, 676, 807
Southwick Power Station, Brighton, Extensions, 372*. See 415
Soviet Government Patent Laws, 554; Naval Construction Programme, 651
Sowden, D., & Sons, Circular Box Loom, 249*
Spain, Power Resources, 32. See 19, 43, 44
— Water Power Development, 43, 44
Spanish Rivers, Flow of, 43
Spanner, E. J., Bow Construction Ships, 618
Spanners, Adjustable (Buck & Hickman, Ltd.), 113*
— British Standard Specification, 748
Spars, Timber, Hollow, McGruer System, 304*
Specific Gravity and After Expansion, Silica Bricks, Relationship, 482
— — Determination, Powdered Firebrick, 482
Specifications, Standard. See *Standard; Standardisation*
— War Office Subsidy Light Lorries, 94, 136
Spectra, Band, and Molecular Structure, 322
— Gases at Low Temperatures, 367
— of Ionised Elements, 321*
— of Nebulæ, 410
Spectrograph, Solar, Poulkovo Observatory, 87*
Spectrum of Titanium, 322
Speech, Nature of, 411
Speed-Changing Gears. See *Gears; Gearing; Marine Propulsion; Motor-Car Details*
— Recorder, Electrical, Magneto Generator for, 208*
— Reduction Gears. See *Gears; Gearing; Marine Propulsion; Motor-Car Details*
— Regulation. See *Governing*
— Trials. See *Trials*
Speedicut Tool Steel, 447
Spelter Prices. See *Metal-Price Diagrams*
Spence-Wild Reduction Gear, 251*. See 622*
Spencer, M., & Sons, Pit-Prop Withdrawing Appliances, 528*
Spencer, Moulton & Co., Ltd., Applications of Rubber in Railway Work, 9*
Spinning Machinery for Cotton, 90*
— Mills, Air-Humidifying Apparatus, Andrew System, 873*
Spirit, Motor. See *Motor Fuels*
Spongy Rubber, Heat-Insulating Material, Research, 682
Spot Welding Machine (A.I. Electric Welding Appliances Co.), 765*
Spraying Apparatus, Water, Air Humidification, Textile Mills, 873*
— Metal, Schoop Process, 409
Spring-Injection System, Blackstone Oil Engine, 60*, 639*
— Manufacture (Vickers, Ltd.), 99
Sprinkling Stoker. See *Stoker*
Spur Gearing. See *Gears; Gearing; Marine Propulsion*
S.R. Boring Cutter (Vickers, Ltd.), 99
St. Lawrence River, Development for Power and Navigation, 239*, 271. See 267; Dredging Work, 438. See *Erratum*, 486
St. Pancras Power Station, Extensions and Efficiency, 642*
Stal-Ljungström Turbo-Generator, Luton Corporation, Tests, 142
Stamping Hammers and Presses. See *Machine Tools*
— Steel (Vickers, Ltd.), 99
Stamps, Drop. See *Machine Tools*
Standards Association. See *Engineering Standards*
— Comparison, Thermal Efficiency of Steam Engines, 818*, 835, 866*
— Electrical, International, Work of National Physical Laboratory, 6
— Keys and Keyways, 878
— Light, Proposed International, 175
— Metre, Interferometers for Calibrating, Japanese Government, 491*
— — National Physical Laboratory Investigations, 101
— Piston Rings, Motor Car Engines, 175. See 583
— Radiation, Furnace as, 101
— Rails and Sections, British Empire Exhibition, 440
— Specifications, Brass Ingots and Castings, 261
Standard Specifications, Cast-Iron Pots for Piston Rings, 583
— — for Copper, 425, 686, 738
— — Electric Resistance Materials, 651
— — Iron and Steel Castings, Motor-Car Manufacture, 176
— — Oil-Engine Fuels, 692
— — Silver Solder, 261
— — for Spanners, 748
— — Valves and Rims, Pneumatic Tyres, 261
— Specimens, Steel Analysis, 439
— Steels, Motor-Car Construction, 181
— Tests Code, Hydraulic Power Plants, 51, 145
— Terms, Telegraphy and Telephony, 142
— United States, Bureau of. See *United States*
— Yard, Design of, 129*
Standardisation, Colliery Requisites, 815
— Engine and Boiler Trials, Work of Committee, 55. See LETTERS, 101. See also 818*, 835, 866*
— Industrial, in Germany, 120, 149
— International, in Power Measurement, 121
— of Magnetos, 142
— National and International Aspects, 121
Stanley Fire Engine Co., Motor-Fire Engine, 386*
Stanton, Dr. T. E., on the Measurement of Wind Pressure on Structures, 800
Stars, Loss of Mass by Radiation, 802
Starter, Cartridge-Type, Petter Oil Engine, 721*
— Motor. See *Motors, Electric*
State Assistance, Egyptian Industries, 586
— Chemical Activities, Historical, 448
— Control, Colliery Industry, Report, 293
— Management of Power Plants, 209
— Railways. See *Railways*
Stations, Power. See *Power Stations*
Statistical Investigations, Factory Accidents, Industrial Fatigue Research Board, 709. See 701, 746, 810
Statistics, Trade. See *Trade*
Stator Windings, Electric Welding Machine, 764*
Steam Accumulators, Use in Factories and Power Plants, 68*
— Boats. See *Steamers*
— Boilers. See *Boilers*
— Condensation. See *Condensation*
— Consumption, 15,000 kw. British-Thomson Houston Turbo-Generator, 704
— — Turbo-Generator, Tests over Three Years, 668
— — See also *Trials*
— Engines. See *Engines*
— Exhaust, Reciprocal Utilisation in Industries, 75
— Generation, Electrically-Heated Boilers, 127, 449
— — Extra High Pressures, 432, 588. See 41, 181*
— — United States, Recent Practice, 42
— Heating, Automatic Temperature Control, 628*
— — Extraction from Turbines, 41, 744. See 503
— Lorries. See *Motor Wagons; Tractors*
— Meters, Use in Boiler Trials, 56. See LETTERS, 101
— Natural, Power Production from, 78
— Navvy. See *Excavating Machine*
— Piping, Mallet Simple Locomotive, 860*. See 795*
— Power Production, United States, Current Practice, 39
— Raising, Coke as Fuel, 40, 82
— Reheating. See *Turbines, Steam*
— Roller. See *Road Roller*
— Shovel. See *Excavating Machine*
— Superheater. See *Superheater; Superheating*
— Tractors. See *Tractors*
— Trials. See *Trials*
— Tug and Water-Boat "Lord Combermere," for Barbados, 370*. See *Erratum*, 415
— Turbines. See *Turbines*
— Users' Association. See *Manchester*
— Wagons. See *Motor Wagons; Tractors*
Steamer "Aurania," Cunard Line, 380
— Bow Construction for Collision, 618
— Cable-Laying, "Edouard Suensch," 196*, 269*
— Cargo, with Unloading Conveyors, Great Lakes, 723*. See *Erratum*, 863
— under Construction, Lloyd's Statistics, 52, 516
— Cost of Speed, 119
— Displacement and Draught, Formula Connecting, 26
— Draught of, Deepening of Colombo Harbour, 457
— "Drottningholm," Geared-Turbine Machinery, 841*
— Dutch, Propelling Machinery, 119
— Electric Propulsion. See *Marine Propulsion*
— Geared Turbines. See *Marine Propulsion*
— Hospital, Conversion for Tourist Service, 463*
— Hull Resistance and Power for Propulsion, 119
— Japanese, Load-Line Regulations, 113
— Laid-up Tonnage, 660
— Launching of. See *Launching*
— Lost, Lloyd's Statistics, 166, 267, 519, 820
— "Mauretania," Cunard Line, Record Voyages, 424; Repairs to Turbines, 424*
— Merchant, Life-Saving Appliances, New Regulations, 587
— — Lloyd's Register Book, 166
— — of the World, Tonnage Owned, 98
— "Orama," Orient Line, 543*, 601*, 643
— "Oronsay," Orient Line, Launch, 265
— Paddle, Conversion to Stern-Wheelers, 463*
— Propulsion of. See *Marine Propulsion; Engines; Turbines; Propellers*
— Refrigerator, Design and Construction, 713
— — Fruit Transport, 743*
— Resistance of. See *Ship Resistance*
— Salvage of. See *Salvage*
— "Seekonk," Conversion to Motor Ship, 714
— Shallow-Draught, Propulsion, Yarrow Flap System, 459. See LETTER, 486
— Swedish, Propelling Machinery, 148. See 120
Steamer, Train Ferry, Japanese, "Shoho Maru," 735*
— United States Shipping Board, Fuel Conservation and Performance Standards, 714
— "Virginian," Propelling Machinery See "*Drottningholm*"
— See also *Engines; Marine Propulsion; Shipbuilding; Shipping; Ships; Turbines; Warships*; PARAGRAPH INDEX
Steamships. See *Ships; Steamers; Warships*
Steel, Acid Pickling of, Tinplate Manufacture, 365
— Balls, Compression of, Formula, 101
— — Hardness Tests, Improvements, 367
— Castings, British Empire Exhibition, 189*, 438, 440
— — Motor-Car Manufacture, Standard Specifications, 176
— — Rudder Frame, H.M.S. "Hood," 180*
— — Vikro Heat-Resisting, 99
Steel Co. of Scotland, Ltd., Exhibit at British Empire Exhibition, 439*
— Cobalt, for Permanent Magnets, 274*, 302*. See 286
— Corrosion. See *Corrosion*
— Ducol High Tensile, 100
— Fatigue of. See *Alternating Stress* under *Tests (Materials)*
— Furnaces. See *Furnaces*
— Heat Treatment of. See *Heat Treatment* under *Metallurgy*
— Hopper Coal Wagon, 42-ton, Bengal-Nagpur Railway, 279*
— Hydrogen Diffusion in, 365
— Industry, Belgian, Statistics, 838
— — German, Present Position, 228
— — Indian, 509, 537
— — Position of, 365
— — South Africa, 205*
— — United States, Power Production and Use, 84
— Ingots and Forgings, Clink Detector, 658*
— Inner Structure and Effect of Stress, 715
— Manganese, Heat Treatment of, 411
— Manufacture. See *Metallurgy*
— Microstructure of. See *Microphotographs; Metallography*
— Nickel, Blading of English Electric Co.'s Turbo-Generator, 762*
— — Influence of Mass on Heat Treatment, 5
— Pipes and Tubes, British Empire Exhibition, 439
— Plates, Oxygen-Jet Cutting Machine, Godfrey, 124*
— — Prices. See *Metal-Price Diagrams*
— Products, British Empire Exhibition, 99*, 438*
— Quenching Stresses, Calculation, 285, 343*
— Rails. See *Rails; Metal-Price Diagrams*
— Railway Wagon, 20-Ton (Cambrian Wagon Co., Ltd.), 766; 42-ton, Bengal-Nagpur Railway, 279*
— Range of Repetition Stresses, Effect of High Temperature, 500, 532*. See 284
— Rolling Mills. See *Rolling Mills*
— Ropes. See *Wire Ropes*
— Scrap, Classification of, 806
— Sections, Hack-Sawing Machines, 320*, 445*
— Sheet Piling Dam, Gladstone Dock Construction, 48*
— Standard, Motor-Car Construction, 181
— — Specimens for Analysis, 439
— Stress Distribution in. See *Stress; Tests (Materials)*
— Tests of. See *Tests (Materials)*
— Tool, High-Speed, Nature of, 347, 393
— — Machine Tool Exhibition, 447
— — Testing Machine for, 446*
— Tubes, Use for Structural Work, 674*. See 716
— Vibrac Molybdenum, 187*; Oxygen Cylinder, 187*. See *Errata*, 423
— Volume Changes in Heat Treatment, 351*
— Wire, Manufacture of, 630
Steelwork, Structural (Dorman, Long & Co., Ltd.), 440
— — Use of Tubular Members, 674*. See 716
— Works. See *Works*
Sterne, L., & Co., Ltd., High-Speed Ammonia Compressor, 594*
Stern-Wheel Steamers, Converted Hospital Ships, 463*
Stevens Petrol-Electric Road Vehicles, 689
Stewarts & Lloyds, Ltd., Exhibit, British Empire Exhibition, 439
Still Marine Oil Engine, Advantages, 84
Stirk, J., & Sons, Ltd., Hilomill Vertical Boring and Turning Mill, 313*; Planing Machines, 362*; Split-Field Electric Drive for Planing Machines, 362*; Velomill Boring Mill, 398*
Stockton & Bunn, Ltd., Lapointe Broaching Machine, 442*
Stoker, Chain-Grate, for Peat, 41*
— Mechanical, Cardiff Engineering Exhibition, 766
— — Internally-Fired Boilers, Lea Coal-Measuring Apparatus, 598*
Stone, J., & Co., Ltd., Electrical Equipment, Kitchen Car, L. & N. E. Railway, 480*
Stone Dusting, Collieries, Materials for, 675; Machine for, 808
Stoney, Dr. G., on Proportioning Impulse Blades and Nozzles, 473*
Stop Valves. See *Valves*
Storage Battery. See *Accumulator* under *Electric; Motor Vehicles*
— Steam, Dr. Ruth's System, 68*
Storek-Kaplan Hydraulic Turbine, 183*. See 63
Stork, C. F., on Steam Turbines for High Pressures, 69*. See 45
Stoves, Drying, Foundry Work, Gas and Coke Firing, 470
Straits Settlements, Penang Hills Railway, 664*, 726*, 789*, 852*
Strauss Bascule Bridge, River Bann, Ireland, 758*
Street Lighting Engineers and Superintendents, Institution of, Conference, 457
— — in Glasgow, 458
— London, Inclined Crossings at Junctions, 641, 648
— Railway. See *Tramways*
Street Traffic Congestion, London, 561. See 522, 640, 647
— — Regulation, Coloured Signals, 24
— See also *Roads*
Strength of Materials. See *Stress* and *Tests (Materials)*
Stresses, Alternating and Combined. See *Tests (Materials)*
— Complex, Report of British Association Committee, 286. See 506
— in Crankshafts, Estimation of, 418
— Distribution, Eccentrically-Loaded Foundation Blocks, 763*
— Earth, Due to Loaded Surface, 1*, 156*
— Effects on Metals, Influence of Inner Structure, 715
— in Hooks, United States Investigations, 491
— Internal, in Brass Tubes, Measurement, 378
— Measurements, Westminster Bridge, 296
— Optical Determination of. See *Optical*
— Quenching, in Steel, Calculation, 285, 343*. See LETTER, 641
— Recorder, the Cambridge, 287
— Repetitions. See *Alternating Stress* under *Tests (Materials)*
— in Rotating Discs, Conical Profile, 418. See LETTER, 486
— Shear, in Tapered Girders, 789*
Stretcher-Bar Mine-Haulage Gear, 733*
Strikes. See *Labour*
Stroboscope, Ashdown, Investigation of Moving Machinery, 236
Stromeyer, C. E., Criticism of New Factory Bill, 334
Strowger Automatic Telephones, York, 862
Structural Steel Sections, Hack Sawing Machines for, 320*, 445*
— Steelwork. See *Steelwork*
Structures, Ferro-Concrete. See *Ferro Concrete*
— Marine, Deterioration of, Report, 774; (Review), 589
— Wind Pressure on, Measurement, 800
"Stuart," H.M. Flotilla Leader, 421
Stuart, J., the Late, 706
Stuart-Street Power Station, Manchester, Turbo Generator Tests, 668
Stub Lathe, Sundstrand, 357*
Styer, Capt. W. D., on Hydraulic Sea-Going Hopper Dredgers, 713
Styrian Water Power Developments, 78
Submarine Boats. See *Warships*
— Telegraphs. See *Telegraphs*
Subsidy, War Office, Light Lorries, Specification, 94, 136
Sub-Stations, Automatic Equipment, British Thomson-Houston Co., Ltd., 13*, 227*; Peebles-Reyrolle System, 323*
— — Hendon-Edgware Extension Railway, 227*
— — Mercury-Vapour Rectifiers, 782*, 845*
Suction Dredger. See *Dredger*
— Gas Engine. See *Engine, Gas*
— — Producer. See *Producer*
Sudan Sandstorms, Haboobs, Notes on, 592
Suds Fire Engine for Oil Fires, 530*
Suez Canal, Proposed Deepening, 457
Sugar, Mechanical Crystallisation, 738
Sulphur in Rubber Industry, 566
Sulphuric Acid Manufacture, Report, 127
Sulzer Brothers, Refrigeration Plant, Brewers' Exhibition, 649; Saurer Gear-Testing Machine, 821*
Sun, Loss of Mass by Radiation, 802
— Setting, Experimental Demonstration of Green Flash, 410
— See also *Solar*
Sunbeam Motor Car, 609*
Sundby, Prof. G., on Rules for Testing Water Power Plants, 145
Sunderland Gear Planer, Double Helical Gears, 363*; Cutter Grinder for, 365*
Sundstrand Stub Lathe, 357*
Sunshine Harvesting Machine, 383
Suorva Dam, Sweden, Design, 76
Super Microscope for Metallography, 514*
Superheaters, Cardiff Engineering Exhibition, 766
— Locomotive. See *Locomotive*
Superheating in Marine Practice, 669
Surface Condensers. See *Condensers*
— Grinding Machine. See *Grinding* under *Machine Tools*
Survey of North-West Greenland, Danish Expedition, 344
— Physical and Chemical, of Coal, 232. See 19, 31, 552
Surveying, Photographic, Gordon System, 142
— Tacheometry, Use of Horizontal Staff, 505*
Swaging Machine, 5-Hammer (T. Ryder & Son, Ltd.), 407*
Swan, Hunter & Wigham Richardson, Ltd., S.S. "Aurania," 380; Naval Construction Work, 460; Motor Seasled, 460*
"Swanley," Motor Ship, Maiden Voyage, 229
Swansea Waterworks, Jet Dispersers, Water Discharge from Reservoir, 247*
Swash-Plate Engine, Armstrong, Gun Mountings, 187*
Sweden, Electric Power in Agriculture, 116
— — Power Distribution, 79
— Electro-Metallurgy in, 117
— Engineering Education, 122
— Fuel and Power Resources, 32, 38, 43
— Hydraulic Turbine Design, 63
— Industrial Research in, 115
— — Standardisation, 121
— Oil-Engine Developments, 105. See 83
— Power Policy, 35
— Railway Electrification, 118
— Water Power in, 43
Swedish Arch-Dam Design, 76
— Oil Shales, Oil Production Plant, 39
— Practice, Steam Power Plants, 503
— Ships, Propelling Machinery, 148. See 120
— Tramways, Electric Power Supply, 118
— Water-Power Plants, Ice Troubles, 45, 463. See 73
Swiss Locomotive and Machine Works, Oil-Engine Driven Shunting Locomotive, 701*
Switch, Gate-End (Switchgear & Cowans, Ltd.), 180*
— Motor Starting. See *Motors, Electric*
Switchboard, Flame Proof, Colliery Work (Mavor & Coulson, Ltd.), 224*

Switchboard, Ironclad Pedestal Type (Erskine, Heap & Co., Ltd.), 107*
Switchgear, Air-Break Circuit Breaker (G. Ellison), 51*
— Automatic Substation Equipment, British Thomson-Houston, 13*, 227*; Peebles-Reyrolle System, 323*; Hendon-Edgware Extension Railway, 227*
— Circuit Breaker, British Thomson-Houston High-Speed Automatic, 14*
— — Breaker, 66,000 Volt Three Phase, Newfoundland Water Power Plant, 127*
— — Breaker, High and Low Speed, Reyrolle, 326*
Switchgear & Cowans, Ltd., Switchgear and Induction Regulators, 180*
Switchgear, Draw-Out Truck Type (Erskine, Heap & Co., Ltd.), 106*; (Switchgear & Cowans, Ltd.), 180*; (Ferguson, Pailin, Ltd.), 468*
— Electric Winding Engine, Penang Hills Railway, 852*. See 789*
— Gate-End Box, Colliery Work (Mavor & Coulson, Ltd.), 224*
— High-Tension, Colliery (Metropolitan-Vickers Electrical Co., Ltd.), 49*
— Ironclad, Oil Immersed (Switchgear & Cowans, Ltd.), 180*
— Low-Tension, Colliery (G. Ellison), 50*
— Recent Swedish Designs, 80
— United States Power Stations, 110
Switzerland, Electric Iron Smelting, Resistance of Coke and Charcoal, 637
— Power Resources, 32. See 19
"Sycamore," M.S., Trials of Diesel Engines, 730, 750*, 784*, 798
Sydney Harbour Bridge, Competitive Designs, 129*, 169. See LETTER, 198*
Sykes Gear-Tooth Comparator, 822*
Synchro-Balance System, Internal-Combustion Engines, 593*. See 22
Synchroniser, Rotary, Switchboard (Erskine, Heap & Co., Ltd.), 107
Synchronous Motors. Use as Condensers, 109
Synthetic Ammonia Manufacture, Haber Process, Franco-German Agreement, 263. See 372
— — Manufacture, Recent Developments, 263. See 372
— — Production, Report, 116
— Cast Iron, Production from Steel Scrap, 276
Systems, Shop. See *Works Management*

T.

TABLES, Shipbuilding, British Corporation, 738
Tacheometry, Use of Horizontal Staff, 505*
Tangyes, Ltd., Centrifugal Pumps, 5; Vertical Ram Pump, 22*
Tank, Experimental, Froude National, Report on Work, 334
— Experiments, Cavitation, United States Warships, 717*. See LETTER, 769
— — Propeller Models, Comparisons, 713
— — See also *Ship Resistance*
— Locomotives. See *Locomotives*
— Ships, Motor. See *Motor*
Tapered Girders, Shear Stresses in, 789*
Tar Distillation, Report on Alkali Works, 128
Tasmania, Great Lake Hydro-Electric Scheme, Self-Closing Valve for Pipe Line, 143*
Tatham, W., Ltd., Carding Engine, 89*
Taxation, Effect on British Industries, 618
— Effects on Motor Cars, 553
Taylor, H. B., on Hydraulic Reaction Turbines, 71. See 45
Taylor, Rear-Admiral D. W., Comparisons of Model Propeller Experiments, 713
Teaching. See *Education*
Technical College and Education. See *Education*
— Costs and Estimates, 582. See 433
— Societies. See *Institutions* and PARAGRAPH INDEX
Teeth, Gear. See *Gear*
Telegraph Cable, Continuous Loading, New York-Azores, 461
— — Laying Steamer "Edouard Suenson," 196*, 269*
Telegraphy, 100 Years' Progress, 194. See 266
— Standard Terms, 142
— Wireless, Amateur Transmitters and the Post Office, 457
— — Direction Finding, Report, 866
— — Electrical Production, Vowel Sounds, 828
— — Manufacture of Thermionic Valves, 456, See 492*
— — Marconi Beacon Station, Nash Point, 582
— — Marconi Beam System, 17, 836
— — Possible Developments, 56
— — Rectifying and Transmitting Valves, 492*
— — Time Signals, International Investigations, 410
— — Use of Short Wave Lengths, 17, 836
— — Work of National Physical Laboratory, 6
— — See also *Valves, Thermionic*
— See also *Electricity* in PARAGRAPH INDEX
Telephones, Automatic, Strowger System, York, 862
— — Systems (Review), 663
— Exchanges, Automatic, Relay System, Chatham Dockyard and Hospital, 373
— Head-Band, Manufacture, British Thomson-Houston Co., Ltd., 747*
Telephony, Progress with, 195. See 266
— Standard Terms, 142
— Wireless, Amateur Transmitters and Post Office, 457
— — Broadcasting, Educational Value, 122
— — Chelmsford Transmitting Station, 494*
— — Manufacture of Head Telephones, 747*
— — Manufacture of Thermionic Valves, 456. See 492*
— — Marconi Beam System, 17, 836
— — Possible Developments, 56
— — Rectifying and Transmitting Valves, 492*
— — Use of Short Wave Lengths, 17, 836
— — See also *Valves, Thermionic*
— See also *Electricity* in PARAGRAPH INDEX
Telescopes, Measuring, Fractional Reading Graticule for, 101*
Telford, Grier & Mackay, Ltd., Wind-Driven Electric Lighting Plants, 60
Tell-Tales, Lubrication (Hawthorn, Leslie & Co., Ltd.), 422*
Temperature Control, Automatic, Electric Furnaces, 451*; Gas Furnaces and Steam Heating, 628*
— Entropy Diagrams, Carville and North Tees Power Stations, 58*
— — Diagram, Gaseous Working Substance, 215*
— Fluctuations, Waldeck Reservoir Dam, 425
— Gas, Measurement by Thermo-Couples, 686
— Gradients, Gases, at Various Pressures, 686
— Measurement and Fuel Economy, 40
— — See also *Pyrometer*; *Thermometer*
Tempering. See *Heat Treatment* under *Metallurgy*
Tempest, Sir P., the Late, 649
Tenders, Locomotive. See *Locomotive*
Tenoning Machine, Sash and Door Work, 298*
Tensile Tests. See *Tests* (*Materials*)
Teredo, Resistance of Brmese Timber to, 508, 548
— Timber Destruction in Sea Water, 775
Ternary Alloys. See *Alloys* under *Metallurgy*
Terrestrial Magnetism. See *Magnetism*
Terry, S. H., the Late, 832
Terry Motion for Towelling Looms, 249*
Testing Apparatus, Insulating Oils, De Laval-Watson, 877*
— Appliances, Gear Teeth, 696*, 821*
— Galvanised Iron Sheets, 825*
— Machine, Alternating Stress, the Olsen, 813*
— — Alternating Stress, University of Illinois, 582*. See 284, 658*
— — for Files, 447
— — Hack-Saw Blades, 445*
— — Hardness, for Dynamic Tests, 844*
— — for Tool Steel, 446*
— — See also *Tests* (*Materials*)
— Water Power Plants, Uniform Rules, 51, 145
— See also *Tests* (*Materials*); *Trials*
Tests, Conductivity, Insulating Materials for Cold Stores, 742*
— Engine and Boiler, Tabulating Results, Work of Committee, 55. See LETTERS, 101. See also 818*, 835, 866*
— Ferrocrete Quick-Hardening Cement, 867
— Hydraulic Turbines, Lawaczeck Type, 851*
— Magnetic. See *Magnetic*

Tests (Materials):—

Alternating Stress Testing Machine, Olsen, 813*
— — Testing Machine, University of Illinois, 582*. See 284, 658*
— — Tests, Effect of Initial Stresses, 343*. See 285
— — Tests, Evidence for Fatigue Limits, 580*, 658*. See 284
— — Tests, Influence of Elastic Limit on Breakdown, 793, 813*
— — Tests, Steel, Effect of High Temperature on Repetition Range, 500, 532*. See 284
— — Tests, Steel at High Temperatures, 793, 844
— — Tests, Work of Fatigue Panel, Aeronautical Research Committee, 245. See 284
Creeping of Steel in Tensile Tests, 793, 816*, 843*
Elastic Limit, Tensile, Influence on Fatigue Breakdown, 793, 813*
Extensometer, High-Temperature Tensile Tests, 816*
Hardness Testing Machine for Dynamic Tests, 844*
— Tests, Brinell, of Copper, Effect of Cold Rolling, 386*, 408
— — Brinell, Improvements in Balls, 367
— — Brinell, Rapid Evaluation of Numbers, 486
— — Bronze, Effect of Casting Temperature and Heat Treatment, 430. See 409
— — Electro-Deposited Metals, 599
— — Gun Metal, Effect of Casting Temperature and Mass, 436*. See 409
— — Static and Dynamic, Steel at High Temperatures, 844*. See 793
Impact Tests, Bronze, Effect of Casting Temperature and Heat Treatment, 430*. See 409
— — Gun Metal, Effect of Casting Temperature and Mass, 436*. See 409
— — Notched Bar, Dimensional Problem, 286
Magnetic Tests. See *Magnetic*
Metals, Plastic Deformation, Effect of Free Surfaces, 366
Notched-Bar Impact Tests. See *Impact Tests* (above)
Repeated-Bending Tests, Wires and Wire Ropes, 856*, 867
Stress Determination, Optical. See *Optical*
Stresses in Materials and Structures. See *Stress*
Tensile Tests, Bronze, Effect of Casting Temperature and Heat Treatment, 430*. See 409
— — Creeping of Steel in, 793, 816*, 843*
— — Elastic Limit, Influence on Fatigue Breakdown, 793, 813*
— — Gun Metal, Effect of Casting Temperature and Mass, 436*. See 409
— — High Temperature, Extensometer for, 816*
— — Steel, High and Low Temperatures, 793, 816*, 843*
— — Wires, Effect of Temperature and Cold Work, 408
Testing Machine, Alternating Stress, the Olsen, 813*
— — Alternating Stress, University of Illinois, 582*. See 284, 658*
— — Hardness, for Dynamic Tests, 844*
Wires and Wire Ropes, Repeated Bending Tests, 856*, 867
Tests, Repeated Bending, Wires and Wire Ropes, 856*, 867
Tests, Stal-Ljungström Turbo Generator, Luton Corporation, 142
— Steam Turbine with Multiple Exhaust, Bristol, 253*
— Turbo Generator and Condensing Plant, Manchester Power Station, 668
— 15,000 kw. Turbo Generator, Grove Road Power Station, 704
— Volumetric Glassware, National Physical Laboratory, 378
— Water-Tube Boilers, High Pressures, 181*. See 41
— — Gas Plants, Analysis of Results, 682
Text Books. See LITERATURE INDEX
Textile Industry, Use of Electric Power, 85
— Machinery, Cotton Preparing, Spinning and Weaving, British Empire Exhibition, 11*, 89*, 247*
— Mills, Air-Humidifying Apparatus, Andrew System, 873*
Thames Bridges, London, and Cross River Traffic, 641, 647
Thermal Conductivity, Insulating Materials, Cold Stores, Tests, 742*
— — Measurement, National Physical Laboratory, 279*
— — Spongy Rubber, 682
— Efficiency, Steam Turbines, 469
— — Electric Power Stations, 377
— — Marine Oil Engines, Report, 730, 750*, 784*, 798
— — Steam Engines, Comparison Standards, 818*, 835, 866*
— — Steam Turbines, Improvement of, 63*. See 45
— — 15,000 kw., Turbo Generator, 704
Thermal Syndicate, Ltd., Silica Mercury-Vapour Lamp and Lenses, 295*
— Treatment, Metals. See *Heat Treatment* under *Metallurgy*
Thermionic Valves. See *Valves*; *Telegraphy, Wireless*; *Telephony, Wireless*
Thermo-Couples, Measurement of Gas Temperatures, 686
— — See also *Pyrometer*
Thermodynamics, Efficiency of Steam Turbines, 469
— Gas Engines, Missing Pressure and Heat Loss, 605, 623*, 629*, 679, 684. See LETTERS, 641, 704, 746
— Mercury-Vapour Turbine, 42
— Power Station Design, North Tees and Carville, 57*
— Steam Generation, Extra-High Pressures, 41, 181*, 432. See 588
— — Turbine, Improving Thermal Efficiency, 63*. See 45
— — Turbines, Advantages of High Pressures, 69*, 178, 470. See 45, 65, 588
— — Turbines, Regenerative Feed Heating, 57*, 64*, 469, 818*, 835, 866*
— — Turbines, Reheating of Steam, 57*, 65*, 470. See 818*
— Temperature-Entropy Diagrams, Carville and North Tees Power Stations, 58*
— — Entropy Diagram, Gaseous Working Substance, 215*
— Thermal Efficiency, Steam Engines, Comparison Standards, 818*, 835, 866*
— Work of Lord Kelvin, 97. See 104
Thermometer, Testing, National Physical Laboratory, 6
— Wet and Dry Bulb, Humidity Measurements, 278*
— See also *Pyrometer*
Thomas Gas Meter, 182*. See *Errata*, 262
Thomas, J. H., on Class Warfare, 681. See LETTER, 746
Thomas Transmission, Road Vehicles, 689*
Thompson, Dr. F. C., on the Plastic Deformation of Metals, 366; on the Inner Structure of Metals, 715
Thomson, C., the Late, 549
Thomson, Prof. Elihu, on Unsolved Problems in Electrical Engineering, 56; Award of Kelvin Medal to, 97. See 104; on the Franklin Institute, 745
Thomson, Sir J. J., Kelvin Oration, 97. See 104
Thomson, R. W., Pioneer Work, Mechanical Transport, 681
Thornton, Sir H., on Railway Transportation in Canada, 266
Thornton, Prof. W. M., Work on Electricity in Mines, 243
Thornycroft, J. I., & Co., Ltd., Naval Exhibits, British Empire Exhibition, 420*; Motor Launch of Indian Timber, 508*
Threads, Screw. See *Screw*
Three-Phase. See *Generator*; *Motor*; *Locomotive*; *Power*; *Railway*
Threshing and Reaping Machine Combined, the Sunshine, 383
Throttle Valve. See *Valve*
Thrust Bearing. See *Bearing*
— Measuring Gear, Michell Hydraulic, Marine Diesel Engine Trials, 785*
Tidal Power, River Severn Scheme, Preliminary Enquiry, 294
Tigris Hospital Steamers, Conversion for Nile Tourist Service, 463*
Timber, Canadian Resources, 138*, 539
— Centring, Ferro-Concrete Arch Bridge, 257*
— Clearing, Trewhella Jacks and Winches, 383
— Drying, Experimental Investigations, 775
— Foundations, London Bridges, Settlement, 641. See 102, 647, 676, 807
— Indian and Burmese, British Empire Exhibition, 507*. See 539, 548
— New Zealand, British Empire Exhibition, 290
— Piles, Deterioration and Preservation (Review), 589. See 775
— Spars, Hollow, McGruer System, 304*
— Structures, Deterioration in Sea Water, Report, 775. See 589
Time Signals, Wireless, International Investigations, 410
Timoschenko, Prof. S., on the Deflection of Circular Plates, 286
Tin Alloys. See *Alloys* under *Metallurgy*
— Box Manufacture, Safety Precautions with Power Presses, 18
— and Tinplate Prices. See *Metal-Price Diagrams*
Tinplate Manufacture, Pickling of Steel, 365
Tipping Wagons, Motor. See *Motor Wagons*
Tipplers for Colliery Tubs, British Empire Exhibition Colliery, 339*
Tirso River Hydro-Electric Scheme, Sardinia, 632*
Titanium, Influence on Iron Castings, 113
— Spectrum of, 322
Tizard, H. T., on Fuels for Internal-Combustion Engines, 616
Tolerances in Machine Work. See *Gauging*
Tool Grinder. See *Grinding* under *Machine Tools*
— Machine. See *Machine Tools*
— Pneumatic. See *Machine Tools*
— Room Lathe. See *Lathe* under *Machine Tools*
— Steel. See *Steel*
Toothed Gears. See *Gear*; *Gearing*; *Marine Propulsion*
Toronto Harbour and Water Supply, 266
— International Mathematical Congress. Hon. Sir C. A. Parsons on the Steam Turbine, 469; Prof. Sir J. B. Henderson on Teaching Mathematics, 491
— Meeting, British Association. See *British Association*
Torpedo Boats and Destroyers. See *Warships*
Torque Measurements, Marine Diesel Engine Trials, 731. See 785
Torsion Tests. See *Tests* (*Materials*)
Torsionmeter, Moullin, Marine Diesel Engine Trials, 731. See 785
Tosi Marine Diesel Engine, 83; Trials of M.S. "Silurian," 643; Trials of M.S. "Sycamore," Report, 730, 750*, 784*, 798
Tourist Steamers, River Nile, Converted Hospital Ships, 463*
Town Gas. See *Gas*
Trackless Trolley System, Road Traction. See *Railless*
Traction Dynamometer. See *Dynamometer*
— Electric. See *Railways*; *Railless*; *Tramways*
— Engine, Steam, Compound (Marshall, Sons & Co., Ltd.), 810*
Tractor, Agricultural, Rein-Drive (J. Fowler & Co. (Leeds), Ltd.), 20, 59*
— — Steam Sentinel, 21*. See 717*
— — Uses of, 382
— Steam, Chain-Track Type, Sentinel, 717*. See 21*
Trade, British, Effect of Taxation, 618
— British Engineering, and German Reparations, 695, 725, 757
— — Export, Development, 680
— — Motor Cycle Exports, 652
— — Need for Overseas Investments, 617
— — Overseas, and International Competition, 298
— — Present Position, 617
— — with Turkey and Colombia, Development, 680
— Coal, British Prices and United States Exports, 518*, 521
— Disputes. See *Labour*
— of Dutch East Indies, Report, 832
— Egyptian, Report on, 586
— Exhibition. See *Exhibition*
— French, Present Position, 332
— German Iron and Steel, Present Position, 228
— Indian Import and Export, Statistics, 276, 306
— Iron and Steel, Position of, 365
— Lithuanian, Report, 268
— Unions. See *Labour*; *Industrial Notes*
Traffic, Road, Census of, 837
— Street, Regulation, Coloured Signals, 24
Trailer Fire Pumps. See *Fire Pumps*
Train-Ferry Steamer, Japanese, "Shoho Maru," 735*
— See also *Railway*
Training. See *Education*; *Apprentices*
Tramways, Birmingham Area, Mercury-Vapour Sub-stations, 783*, 845*
— Comparisons with Railless-Electric and Petrol Vehicles, 719. See 688
— Construction, Schemes in Parliament, 777
— and London Traffic Problem, 522. See 640, 647
— Swedish, Electric Power Supply, 118
— Wheels, Tyres and Axles, British Empire Exhibition, 438, 439
— See also PARAGRAPH INDEX
Transformers, Calcium-Chloride Breathers, 802*
— Colliery Work, Metropolitan-Vickers, 49*
— Föttinger Hydraulic, Diesel-Engine Drive, M.S. "Vulcan," 92*, 369*
— High-Tension Testing, Henley's Cable Works, 737*
— Induction Regulators (Switchgear & Cowans, Ltd.), 181*
— Oil, De Laval-Watson Testing Apparatus, 877*
— — Filter Press for, 768*
— United States Power Stations, 109
— Weirs, Utilisation of Low-Head Water Power, 435*
Transmission, Electric, Ship Propulsion. See *Marine Propulsion*
— Gear. See *Gear*; *Gearing*; *Marine Propulsion*; *Motor-Car Details*
— of Power. See *Marine Propulsion*; *Power Transmission*
Transport, Aerial. See *Aeronautics*
— Coastal Shipping and Railway Competition, 774
— and the Development of South Africa, 450
— Facilities, French African Colonies, 674
— Institute of, Congress at British Empire Exhibition, 450; Presidential Address by Sir L. Macassey, on the London Traffic Problem, 522; A. E. Bassom on London Traffic, 651; Sir A. Read, on Coastal Shipping, 774
— London, Work of the Engineer, 640, 647. See LETTERS, 676
— Ministry of, Report on Railway Accidents, 484; Report on Railway Employees, 524; Road Improvements, London Area, 571*; Census of Road Traffic, 837
— Motor. See *Road*; *Motor*
— Railway. See *Railway*
— Road. See *Road*; *Motor*; *Railless*
— Sea, Power for, 118
— — and Rail, Fruit, Cold Storage, 743*

Transport Work, United States, Internal-Combustion Engines for, 117
Transverter, High-Tension Direct-Current Power Transmission, 14, 81
Trap, Rotary, Centrifugal Sewage Pumps, 218*
Travelling Crane. See *Crane*
Travers, Dr. W. M., on Tests of Water Gas Plants, 682
Travers-Clark System, Gas Manufacture, 23
Trewhella Jacks and Winches, Timber Clearing, 383
Trials, Engine and Boilers, Tabulating Results, Work of Committee 55. See LETTERS, 101. See also 818*, 835, 866*
— Light Two-Seater Aeroplanes, at Lympne, 525*. See 232, 549, 652
— Marine Oil Engines, Report, 730, 750*, 784*, 798
— Motor Ship "Silurian," 643
— — Tanker "British Aviator," 236, 369
— Parker Low-Temperature Carbonisation Plant, 588*
— Stal-Ljungström Turbo Generator, Luton Corporation, 142
— Steam Turbine, with Multiple Exhaust, Bristol, 253*
— Steamer "Orama," 643. See 543*, 601*
— 15,000-k.w. Turbo Generator, Grove Road Power Station, 704
— Turbo Generator and Condensing Plant, Manchester Power Station, 668
— Water-Tube Boilers, High Pressures, 181*. See 41
— Yarrow Boiler, Londonderry Power Station, 177*
— See also *Tests*
Triple-Expansion Engines. See *Engines, Steam*
Tripoli, Port of, Position and Possibilities, 838
Tritton, F. S., on Iron and Oxygen, 366
Trolley, Trackless, Road Traction. See *Railless*
Trough Conveyor for Colliery Workings, 227*
Trucks, Railway. See *Wagons*
— See also *Bogie*
Tubes, Bending Machines for. See *Machine Tools*
— Brass and Copper, British Empire Exhibition, 335
— — Measurement of Internal Stresses, 378
— Condenser, Corrosion of, 335, 378
— Manufacture (Vickers, Ltd.), 99
— Railways. See *Underground Railways*
— Steel, British Empire Exhibition, 439
— — Use for Structural Work, 674*. See 716
— See also *Pipes*
Tubs, Colliery, Creepers and Tipplers, Coal-Screening Plant, 338*
— — Gate-End Conveyor for Loading, 227*
— — Weighing Machine for, 338
Tug, Motor, Diesel-Electric System, New York Harbour, 714
— Oil-Engine Driven, Egyptian Government, 517*
— Steam, "Lord Combermere," for Barbados, 370*. See *Erratum*, 415
— — and Oil-Engine Propulsion, Comparisons, 517
Tungsten Filaments, Thermionic Valves, Manufacture, 456
— Lamps. See *Lamps* under *Electric*
Tunnel Enlargement, City and South London Railway, 640, 775
— Penang Hills Railway, 668*
— River Mersey, Proposed, 461
Tunnelling Work, London Tube Railway Construction, 640. See 647, 676, 775
Turbine, Compressed Air, and Generator, Electric Colliery Lamp, 530*
— Gas, Present Position and Possibilities, 83
— Hydraulic, American Practice, 71. See 45
— — Automatic Intake Control, Water Channels, 432*
— — and Centrifugal Pumps, Transformer Weirs, Utilisation of Low Heads, 435*
— — Design of, 63
— — Design of Draft Tubes, 153*
— — Design of Large Alternators, 565
— — 14,000-h.p. Francis, Deer Lake Power Station, Newfoundland, 126*
— — Impulse and Reaction Types, 44
— — Italian, Recent Developments, 44
— — Kaplan Type, 63, 183*
— — Lawaczeck Type, Low Heads, 63, 434*; Tests, 851*
— — Low Power (J. J. Armfield & Co., Ltd.), 612*
— — Oil-Pressure Governor for, 610*
— — Queenston-Chippawa Hydro-Electric Development, 256*. See 220*, 267
— — Rotors for (Vickers, Ltd.), 100*
— — Uniform Rules for Testing, 51, 145
— — See also *Power Plant, Hydro-Electric*
— Mercury-Vapour, Power Production, 42
— Pumps. See *Pumps, Centrifugal*
— Steam, Accidents to, Report, 417
— — 15,000-kw. Grove Road Power Station, Tests, 704
— — Back Pressure, German Practice, 41. See 503, 744
— — Blading for. See *Blading*
— — 5,000-kw. Brush-Ljungström, British Empire Exhibition, 71*
— — Brush-Ljungström, Manufacture, 699*
— — and Centrifugal Boiler-Feed Pump (G. & J. Weir, Ltd.), 216*; (Gwynnes Engineering Co., Ltd.), 218*
— — and Centrifugal Oil Pump, Turbo-Generator Lubrication, 762*
— — and Centrifugal Pump, Condensate, S.S. "Drottningholm," 841*
— — 50,000-kw., for Chicago, 66*. See 45
— — Deposits on Blading, 417
— — Design of Exhaust End, 65*. See 45
— — Erste-Brunner and Ljungström, Comparisons, 142
— — Erste-Brunner, Principles of Design, 69*. See 46
— — Extra-High Pressures, 69*, 178, 470. See 45, 65, 588
— — Geared, and Centrifugal Boiler-Feed Pump, 626*
— — Geared (English Electric Co., Ltd.), 698*, 760*
— — Geared, Reid-MacLeod Locomotive, 479*
Turbine, Steam Impulse, Proportioning Blades and Nozzles, 473*
— — Manchester Power Station, Tests over Three Years, 668
— — Marine, de Laval Type, S.S. "Drottningholm," 841*
— — Marine, Geared. See *Marine Propulsion*
— — Marine, S.S. "Mauretania," Repairs, 424*
— — Marine, S.S. "Orama," 601*. See 543*, 643
— — Marine, Treatise on (Review), 336
— — 7,000-kw. Metropolitan-Vickers, Multiple Exhaust, Bristol Corporation, Tests, 253*
— — Pass-Out or Extraction Type, 41, 744. See 503
— — Principles and Progress, 469
— — Regenerative Feed Heating, 57*, 64*, 469, 818*, 835, 866*
— — Reheating Steam during Expansion, 57*, 65*, 470. See 818*
— — Speed and Output, Relationship, 698*
— — Stresses in Discs, Conical Profile, 418. See LETTER, 486
— — Thermal Efficiencies, 63*, 469. See 45
— — Thermal Efficiency, Standards of Comparison, 818*, 835*, 866*
— — See also *Turbo-Generators; Turbo-Alternators*
— Steamers. See *Steamers; Warships*
Turbo-Alternators, High-Speed, Hungarian Practice, 80, 206*
— — Stator, Road and Rail Transport, 370, 552
Turbo-Electric System, Ship Propulsion. See *Marine Propulsion*
Turbo-Generators, Accidents to, Report, 418
— — 15,000-kw. British Thomson-Houston, Grove Road Power Station, Tests, 704
— — 6,000-kw., Brighton Power Station (Metropolitan-Vickers Electrical Co., Ltd.), 372*
— — 5,000-kw. Brush-Ljungström, British Empire Exhibition, 71*
— — Brush-Ljungström, Manufacture, 699*
— — Brush-Ljungström, St. Pancras Power Station, 642*
— — Brush System of Stator Windings, 71*
— — 50,000-kw., for Chicago, 66*. See 45
— — Electrical Design, Large Units, 565
— — 400-kw., Geared (W. H. Allen, Sons & Co., Ltd.), 372*
— — 1,000-kw., Geared (English Electric Co., Ltd.), 698*, 760*
— — Manchester Power Station, Tests over Three Years, 668
— — Regenerative Feed Heating, 57*, 64*, 469, 818*, 835, 866*
— — Reheating Steam during Expansion, 57*, 65*, 470. See 818*
— — Rotor Shaft Failures, 418
— — Speed and Output, Relationship, 698*
— — Stal-Ljungström, Luton Corporation, Tests, 142
— — United States Power Stations, 108
Turkey, Economic and Commercial Conditions, Report, 680
Turner, Prof. W. E. S., on the United States Glass Industry, 592
Turner, T. H., on Metal Spraying, 409
Turning and Boring Mills. See *Machine Tools*
— See *Machine Tools*
Turret Lathes. See *Lathes* under *Machine Tools*
Twells Valve Gear for Duplex Pumps, 3*
Tyacke, J. A., Electric Harmonic Analyser, 651. See 876*
Tyer & Co., Ltd., Railway Signalling Apparatus, British Empire Exhibition, 9; Signalling Appliances, Penang Hills Funicular Railway, 853*
Tyres, Pneumatic, Low-Pressure, Motor-Car, Advantages, 805
— Pneumatic, Valves and Rims, Standard Specifications, 261
— Railway and Tramway, British Empire Exhibition, 100, 438, 439
— Rubber and Pneumatic, Invention and Early Use, 681
"Tyrian," H.M. Destroyer, Yarrow Boiler, 459*

U.

ULSTER Coalfield, Development, 175
Ultra-Violet Light, Fused-Silica Lenses, 296
Underfeed Stoker Co., Ltd., Travelling-Grate Stoker, 767
Underground Railway, City and South London, Tunnel Enlargement, 640; Reopening of Line, 775
— — London, History of Construction, 640. See 647, 676
— — London, Charing Cross to Kennington Extension, 328
— — London, Hendon-Edgware Extension, Automatic Substation, 227*; Opening, 260
— Water Supplies, Pollution of, 151
Unemployment. See *Labour*
Unions, Trade. See *Labour*
United States, Anti-Aircraft Guns, 204
— — Battleships, Gun Alterations and Washington Treaty, 331
— — Bauxite and Aluminium in, 838
— — Bureau of Mines, Investigations on Synthetic Cast Iron, 276; Use of Explosives in Mines, 291; Clinker Formation in Boiler Furnaces, 548; Stone Dusting in Coal Mines, 675
— — Bureau of Standards, Tests of Girder Hooks, 491
— — Coal Exports, Effect of British Prices, 518*, 521
— — Coast-Defence System, 170
— — Dam Construction in, 466
— — Electro-Metallurgy in, 117
— — Engineer Department, Sea-Going Dredgers, 713
— — Glass Industry, Present Position, 592
— — Hydraulic Turbine Practice, 71. See 45
— — Industrial Organisation, Munitions Supply, 201
— — Industrial Research in, 115
— — Internal-Combustion Engines for Transport, 117
United States Iron and Steel Industry, Power Production and Use, 84
— — Marine Propulsion, Practice, 120
— — Naval Airship ZR.3, Transatlantic Voyage, 548
— — Navy. See *United States* under *Warships*
— — Non-Ferrous Metallurgy in, 376
— — Paper Manufacture, Application of Power, 85; Paper Supply, 692
— — Pertoleum Production and Consumption, 765
— — Power Production, Social Aspect, 36, 37
— — Power Resources, 18, 31
— — Power Stations, Electrical Equipment, 108
— — Public Services, Regulation, 37
— — Railways. See *Railways; Railroads*
— — Research Work, Marine Piling (Review), 589
— — Scout Cruisers and Destroyers, Cavitation Investigations, 717*. See LETTER, 769
— — Shipping Board Steamers, Fuel Conservation and Performance Standards, 714
— — Steam Power Production, Practice, 39, 42
— — Synthetic Nitrogen, 264. See 372
— — See also *America*
Universal Grinding Machine. See *Grinding Machine* under *Machine Tools*
University of Illinois, Fatigue Tests of Metals, 580*, 658*. See 284
— of Leeds, Jubilee Celebration, 839
— College, London, Chemical Engineering Laboratory, 682
— of London Degrees in Engineering, 831
— See also *Education*
Upper Atmosphere. See *Atmosphere*
Uraga Dock Co., Train-Ferry Steamer "Shoho Maru," 735*

V.

VACUUM Pump. See *Pump*
— Tube. See *Röntgen Rays; Telegraphy, Wireless; Telephony, Wireless; Valves, Thermionic*
Valiant Portable Air Compressor, 753*
Valves, Annular, Plate, Walker Air Compressor, 192*
— — High-Speed Ammonia Compressors, 561*, 594*
— Automatic Control, Air-Humidifying Apparatus, 873*
— Electrical Operation, Dean System, 671*
— Gas and Steam, Automatic Temperature Control, 628*
— Gear, Fuel-Injection, Blackstone Oil Engine, 60*, 630*. See 21
— — Twells, for Duplex Pumps, 3*
— — Walschaert, Locomotive for Buenos Ayres Great Southern Railway, 282*
— Johnson, Queenston-Chippawa Hydro-Electric Development, 256*
— Oil-Fuel Pipe Lines, 793
— Piston, Milling Ports of Liners, 354*
— Pneumatic Tyres, Standard Specifications, 261
— Ring, High-Speed Ammonia Compressors, 561*, 594*
— — Plate, Walker Air Compressor, 192*
— Self-Closing, for Pipe Lines, 143*
— Stop, Geared Turbo Generator, 761*
— Thermionic, Manufacture, 456. See 492*
— — Rectification of High-Tension Currents, 492*
— — Water-Cooled, for High Powers, 493*
— — See also *Telegraphy, Wireless; Telephony, Wireless*
— and Valve Gear. See also *Engines*
Van Rossem, Dr. A., on Rubber Latex, 776
Variable Speed Gear. See *Gear; Motor-Car Details*
Vector Quantities Dimensional Notation, 686
Vee-Notch Water Recorder, Lea Closed-in Type, 598*
Velocity of Light, Recent Measurements, 738
Velomill Boring Mill, 398*
Veloplane Planing Machine, 362
Venezuela, Motor Launch "Invermira," 800*
Ventilating Fan, Mine, Sirocco Type, 160*
Ventilation, Air Washers and Fliters, 780
— Police Court, Fanmakers' Company Prize, 754
Vereeniging Estates Exhibit, British Empire Exhibition, 205*
Vertical Illuminator for Microscopes, 30*
— Retorts, Gas Manufacture, with Waste-Heat Boilers, 23
Viaducts, Arched, Penang Hills Railway, 667*
— Cast-Iron Arch, French Railway, Repair Work, 557
— See also *Bridges*
Vibrac Molybdenum Steel, 187*; Oxygen Cylinder, 187*. See *Errata*, 423
Vibration Recorder, the Cambridge, 287
Vickers, Ltd., Metallurgical Exhibits, British Empire Exhibition, 99*, 335; Duralumin Exhibits, British Empire Exhibition, 335*; Variable-Speed Winches, 211*; Electric Capstan, 502*; Orient Liner "Orama," 543*, 601*, 643; Launch of M.S. "Moveria," Donaldson Line, 548; Contraflo Air Pumps, 573*; Tirso Hydro-Electric Scheme, 632*; Airship for British Government, 651
Vickers-Petters, Ltd., Oil Engine for Motor Tug, 517*; Two-Speed Oil Engine, Grain Elevator Drive, 643*
Victaulic Pipe Joints, Cleaning Water Mains, 14; British Empire Exhibition Colliery, 193*
Vikro Heat-Resisting Steel Castings, 99
"Virginian," S.S., Propelling Machinery. See "*Drottningholm*"
Vivian, A. C., on an Extension of the Middle-Third Theory, 763*
Voltage Regulation, Electric Power Supply, 78
Volume Changes, Steel, during Heat Treatment, 351*
Volumetric Glassware, National Physical Laboratory, Tests, 378
"Vulcan," M.S., Diesel-Hydraulic Drive, 92*, 369*

W.

WADE Screw-Cutting Lathe, 749*
Wadkin & Co., Sandpapering and Mortising Machines, 23*
Wages. See *Labour*
Wagon, Coal, 42-ton Hopper, Bengal-Nagpur Railway, 279*
— Motor. See *Motor Wagons*
— Railway Repair, Petrol-Driven, Four-Wheel Drive, 817*
— 20-ton Steel Construction (Cambrian Wagon Co., Ltd.), 766
Waldeck Reservoir Dam, Temperature Fluctuations, 425
Walker Brothers (Wigan), Ltd., Air Compressor 190*; Refuse Collection, Pagefield System, 655*
Walker Electric Vehicles, 689*. See 719
Walker, Prof. M., Electric Harmonic Analyser, 651. See 876*
Wallsend Slipway and Engineering Co., Ltd., Oil-Fuel Apparatus, 345*; Repairs to Turbines, S.S. "Mauretania," 424*
Walls, Retaining, for Reclaimed Land, 438. See *Erratum*, 486
Walschaert Valve Gear, Locomotive for Buenos Ayres Great Southern Railway, 282*
War, European. See *European War*
— Munitions Supply, Industrial Organisation, 201
— Office Subsidy, Light Lorries, Specification, 94, 136
Ward, Haggas & Smith, Pulley-Turning Lathe, 358*; Planing Machines, 362*
Ward, H. W., & Co., Ltd., Turret and Capstan Lathes, 356*
Warfare, Naval. See *Warships*
Warships:
Aviation, Naval. See *Aeronautics*
Coastal Motor Boats, Thornycroft, British Empire Exhibition, 421*
French Coast-Defence Measures, 170
— Naval Officers, Recruitment from Ecole Polytechnique, 554
— Navy, Committee on Marine Engineering, 524
— — Estimated Expenditure, 780
— — New Construction, 453, 572, 582, 871
— — Reorganisation of High Command, 839
— — Scientific Research, 854
— — Submarines for Convoy Duty, 587
German Fleet, Sunken, at Scapa Flow, Salvage Work, 233*. See 373
Guns, Naval. See *Guns*
Gunboats, Shallow-Draught, Yarrow, 459. See LETTER, 486
H.M. Destroyer "Tyrian," Yarrow Boiler for, 459*
H.M. Flotilla Leaders, "Montrose," "Stuart" and "Marksman," 421
H.M. Navy, Development of Propelling Machinery, 669
H.M.S. "Benbow," Model, British Empire Exhibition, 187
H.M.S. "Ceres," Model, British Empire Exhibition, 189
H.M.S. "Hood," Steel Casting for Rudder Frame, 189*
H.M.S. "Malaya," Model, British Empire Exhibition, 187
H.M.S. "Repulse," Model, British Empire Exhibition, 189
Italian Navy, Autumn Manœuvres, 806
— — New Destroyers, 582
— Submarines, Design and Functions, 171, 232
Mine Sweeping Sloops (Wm. Simons & Co., Ltd.), 460
Naval Aeronautics. See *Aeronautics*
— Exhibits, British Empire Exhibition, 185*, 420*, 458*. See LETTER, 486. See *Errata*, 423
— Warfare, French Coast-Defence Measures, 170
— — Merchant Shipping in, Italian Manœuvres, 806
Russia, Soviet Naval-Construction Programme, 651
Sloops, Mine Sweeping (Wm. Simons & Co., Ltd.), 460
Submarines for Convoy Duty, French Navy, 587
— Design and Functions, Italian Views, 232
— Italian Class "O" Type, 171
— Large, Prof. O. Flamm's Design, 837*
— Testing Dock, Use for Salvage Operations, 233*. See 373
Torpedo Boats and Destroyers, Thornycroft, 420; Hawthorn, Leslie & Co., Ltd., 421; Yarrow, 459; Swan, Hunter & Wigham Richardson, Ltd., 460
— — Destroyers, German, Salvage at Scapa Flow, 233*. See 373
United States Battleships, Gun Alterations and Washington Treaty, 331
— — Coast-Defence System, 170
— — Naval Airship Z.R.3, Transatlantic Voyage, 548
— — Navy, Aircraft Developments, 490
— — Navy, Breaking up Warships, 714
— — Navy, Oil Fuel Supplies, 765
— — Scout Cruisers and Destroyers, Cavitation Investigations, 717*. See LETTER, 769
Warship Design, Influence of Aeronautics, 722. See 713
Washington Treaty, Breaking up United States Warships, 714
— — and Gun Power of United States Battleships, 331
See also *Naval* in PARAGRAPH INDEX
Washers, Air, Ventilation Purposes, 780
Washing Machines, Casks and Bottles, Brewers' Exhibition, 649
— — for Coffee Berries, 542*
— — Laundry Work, Canadian, 140*
— Plant, Diamonds, De Beers Mines, 205*

Washing Plant, Rheolaveur, for Coal, British Empire Exhibition Colliery, 411*
Washington Treaty, Breaking up United States Warships, 714
— — and Gun Power of United States Battleships, 331
Waste-Heat Boilers, Vertical Gas Retorts, 23
— — Reciprocal Utilisation in Industries, 75
— Liquors, Gas Manufacture, Treatment, 128
Water-Boat, "Lord Combermere," for Barbados, 370*. See *Erratum*, 415
— Channels, Automatic Intake Control, 432*
— Concrete Mixing, Investigations, 618
— Consumption of Engines. See *Steam Consumption; Trials*
— Cooling, Cold-Rolling Mill Bearings, 636*
— — Diesel Engine Pistons, Duplex Pump, 5*
— — Systems, Monitor Flow Indicator, 548
— Cooled Valves, Wireless Transmitting Apparatus, 493*
— Discharge, Jet Dispersers for, 247*
— Filters. See *Filters*
— Friction. See *Hydrodynamics; Ship Resistance*
— Gas. See *Gas*
— Heaters. See *Feed-Water Heaters*
— Mains, Cleaning, Victaulic Pipe Joints, 14
— — Self-Closing Valves for, 143*
— Meters, Use in Boiler Trials, 45. See LETTERS, 101
— — Recording V-Notch, Lea Closed-in Type, 598*
— Power. See *Power, Water*. See also *Hydraulic; Power Plant; Turbine, Hydraulic; Tidal Power*
— Spraying Apparatus, Air Humidification, Textile Mills, 873*
— Supplies, Underground, Pollution of, 151
— Supply, Bombay, Lake Tansa Pipe Line, 562*
— — Calcutta, 178
— — Edmonton, Canada, 539
— — Egyptian Towns, Purification and Chlorination Plant, 735
— — Schemes in Parliament, 777
— — Toronto, Shifting-Sand Filtration Plant, 266
— — See also *Irrigation*
— Tube Boiler. See *Boiler*
— Turbines. See *Turbines, Hydraulic; Power Plant; Power, Water*
— Vapour and Circulation of the Air, 410
— Wheels. See *Turbines, Hydraulic; Power Plant; Power, Water*
Waterloo Bridge, Foundation Settlements and Proposed Reconstruction, 102, 641, 807. See 647, 676
Waterways. See *Rivers; Canals; Navigation, Inland*
Waterworks Association, British, A. B. Cathcart on Underground Water Supply, 151
— Chester, Pumping Station, Remote Control, 671*
— Swansea, Jet Dispersers, Water Discharge from Reservoir, 247*
— See also *Water Supply* and PARAGRAPH INDEX
Watkins, W. G., on Oil-Fuel Pipe Lines, 792, 823*, 853*
Watson, E. A., on Cobalt Magnet Steels, 274*, 302*. See 286
Watson, J. D., on Bio-Aeration in Sewage Purification, 241. See 286
Watson, J. H., on Nickel for Coinage, 378
Watts, R. E., Balanced Internal-Combustion Engine, 593*. See 22
Wave Form, Alternating Currents, Harmonic Analysing Instruments, 651, 876*
— Length of Light, Calibration of Standard Metre, 491*
— Making Resistance of Ships. See *Ship Resistance*
Waves, Electromagnetic. See *Telegraphy, Wireless; Telephony, Wireless*
Wealth, Distribution of, 681. See LETTER, 746
Weather. See *Meteorology*
Weaving Machinery, Cotton Fabrics, British Empire Exhibition, 247*
— Sheds, Air-Humidifying Apparatus, Andrew System, 873*
Webster & Bennett, Ltd., Vertical Turret Lathe and Boring and Turning Mill, 310*
"Wee Bee" Light Aeroplane, 525*
Weighing Machine for Colliery Tubs, 338
Weights, Marine Propelling Machinery, 670, 730, 750
Weir, Automatic, Spillway of Tirso Dam, 635*
— River Seine Regulation Works, 682*
— Transformer, Utilisation of Low-Head Water Power, 455*
Weir, G. & J., Ltd., Pumping Machinery, British Empire Exhibition, 216*; Air Compressor, 425*
Welding, Arc, Repairs to French Railway Bridge, 557
— Engineers, Institution of, E. A. Atkins on Manufacture of Steel Wire, 630
— Machines (A.1 Electric Welding Appliances Co.), 764*, 827*
Welfare Work. See *Labour*
Welsh Oil Shales, Properties and Uses, 777
Wembley Park Exhibition. See *British Empire Exhibition*
Werkspoor Double-Acting Diesel Engine, 26*
West, Dr. G., Mercury-Vapour Pump, 267*
West, H. J., & Co., Ltd., Refrigerating Plant, 173*
West Africa, French, Railway Needs, 674
— Midlands Electricity District, 745
Western Union Telegraph Co., New York-Azores Cable, 461
Westgarth, T., on the Industrial Machine, 585
Westinghouse Brake and Saxby Signal Co., Ltd., Double-Wire Railway Signalling System, 163*
Westminster Bridge, Stress Measurements, 296
Wheels, Gear. See *Gears; Gearing; Marine Propulsion*
— Grinding. See *Grinding* under *Machine Tools*
— Railway Rubber-Supported Steel Tyre, 9*
— — and Tramway, British Empire Exhibition, 438, 439
Whipple, R. S., on Recording Instruments, 287
Whitby, Prof. G. S., on Acidity of Raw Rubber, 334
White, W. B., & Sons, Ltd., Loom for Cotton Goods, 249*
White, J. S., & Co., Ltd., Steam Tug and Water-Boat, Barbados, 370*. See *Erratum*, 415; Oil-Engined Tugs, Egypt, 517*
White Metal. See *Alloys* under *Metallurgy*
Whitworth Scholarships and Dockyard Apprentices, 741. See LETTERS, 746, 770, 810, 831, 861
— — Regulations, 233
Wiberg, O. A., on Reversing Clutch Marine Turbine, 144*. See 120; on High-Pressure Water-Tube Boilers, 181*. See 41
Wicksteed, C., & Co. (1920), Ltd., Hack-Sawing Machines, 445*
Wilczek, E., on Turbo-Alternator Design, 206*. See 80
Wild, M. B., & Co., Ltd., Haulage Gear, 251*, 622*; Coke-Oven Charging Machine, 512*
Wilkins Wire and Wire Ropes, Ltd., Exhibit, British Empire Exhibition, 439
Williams, E., on Economics of Coal Mining, 518*, 521
Williams, L., on Refrigerator Ships, 713
Williams-Janney Variable-Speed Winches, 211*
Willison Automatic Railway Coupling, 478
Wilson-Wolf Engineering Co., Ltd., Fractional Horse-Power Electric Motors, 700
Winches, Boat and Cargo, Williams-Janney Gear, 211*
— Cable-Handling, Cable Ship "Edouard Suenson," 269*. See 196*
— Electric, for Ships, Austin Constant-Current System, 734*
— Trewhella, for Timber Clearing, 383
Wind-Driven Electric Generators, Use in Agriculture, 382
— — Lighting Plants, Airolite, 60
— — Power Stations, 77
— Power Calculations and Meteorological Data, 77
— Pressure on Structures, Measurement, 800
— Relation to Height, 410
Windings, Electrical Machines, Welding Machine for, 764*
— Engine, Electric, Penang Hills Railway, 780*, 852*
— — Steam or Compressed Air (Holman Brothers, Ltd.), 732
— Frame, Cotton Yarn, 91*
Window Sashes, Tenoning Machine for, 298*
Wire Ropes, British Empire Exhibition, 439
— — Lubrication of, Effect, 858, 868
— — Railway, Penang Hills, 664*, 726*, 780*, 852*
— — Research, Report on, 856*, 867
— Steel, Manufacture of, 630
Wires, High-Temperature Tensile Tests, 408
— and Wire Ropes, Repeated Bending Tests, 856*, 867
Wireless Telegraphy. See *Telegraphy*
— Telephony. See *Telephony*
— Society. See *Radio Society of Great Britain*
Wiring, Electric, of Buildings, Regulations, 202
Wöhler's Tests. See *Alternating Stress* under *Tests (Materials)*
Wolseley Motors, Ltd., Thread-Grinding Machine, 547*; 11-22 h.p. Motor Car, 574*
Wolverhampton Corrugated Iron Co., Ltd., Electric Crane for, 164*
Wood Printing Machine, Box Manufacture, 544*
— Pulp Industry, Canada, 539
— Waste, Drying Towers for, 39, 503
— — Gas Producers Using, 39, 503
Wooden Box Manufacture, Nailing and Printing Machines, 544*
Woodhouse, W. B., on Electricity Supply, 617
Woodvine, G. R., on Volume Changes in Steel during Heat Treatment, 351*
Woodworking Machinery. See *Machine Tools*
Woolwich Research Department, Mercury-Vapour Pump, 267; Extrusion of Brass Rod by Inverted Process, 387*. See 379, 415; Effect of Cold Rolling on Hardness of Copper, 386*. See 408; Report on Manganese Steel, 411
Workmen's Compensation. See *Labour*

Works:—

Accumulator Factories, Lead Poisoning, Home Office Regulations, 753
Alkali Works, Report on, 1923, 127
Brush Electrical Engineering Co., Ltd., Turbine Manufacture, 699*
Factory Accidents. See *Accidents*
Ford Motor Company, Proposed Works at Dagenham, 91
Henley's Cable Works, Research Laboratories, 736*
Shelton Iron Works, Coke-Oven Plant, 510*
Welfare Movement in Works. See *Labour*

Works Management, Experience with Welfare Schemes, 237
— — Reduction of Manufacturing Costs, 419
— — Technical Costs and Estimates, 582. See 433
— — Treatises on (Reviews), 619, 664
Workshop Accidents. See *Accidents*
— Training. See *Apprentices; Education*
— See also *Works; Machine Tools*

World Power Conference:—

Opening Proceedings and Dinner, 18
Concluding General Meeting and Resolutions, 123

Section A.—Power Resources.—
Power Resources, British Empire and United States, 18, 31
Power Resources, European, Asiatic and South American Countries, 19, 32

Section B.—Water Power Production.—
Problems Relating to Run-off, Storage and the Allocation of Catchment Areas in Great Britain and Ireland, by W. J. E. Binnie, 42
Factors of Efficiency in Hydro-Electric Development by Lieut.-Col. C. M. Norrie, 42
Hydro-Electric Power in France, by MM. Arbelot and Dupin, 42

World Power Conference—*continued.*

Section B.—Water Power Production—cont.
Hydro-Electric Power in France, by M. Maroger, 42
Supplementary Steam Generating Stations, Water Power Plants, by G. Motta, 42
Recent Practice in Lake Storage and what the Storage Means to Water Power Utilisation in Sweden, by G. Berg, 43
Recent Practice in Swedish Water Power Engineering, by A. Westerlind, 43
Production of Water Power in Sweden, by A. Ekwall, 43
Reliability of Operation of Hydro-Electric Plants, by K. E. Nylander, 43
Some Features of Modern Hydro-Electric Developments, by D. Mayoral, 43
Regime of Flow of Some Spanish Rivers, by C. Mendoza, 43
Generation of Hydro-Electric Power in Canada, by H. G. Acres, 43
Power Development on Navigable Rivers, by C. Keller, 43
Recent Practice in Civil Engineering with Reference to Water Power Production, by Dr. Ing. K. Innerebner, 44
Civil Engineering Features of Water Power Development in the Dutch East Indies, by W. Blaser, 44
Recent Development in Dam Construction in Italy, by L. Mangiagalli, 44
Recent Developments in Italian Water Turbines, by G. Ucelli, 44
Report on Progress in Mechanic l Engineering with Reference to Power Production, 44
Mountain-Side Canals, by E. Azarola, 44
Impulse Water Wheels, by W. M. White, 44
Hydraulic Reaction Turbine, by H. B. Taylor, 71. See 45
Experimental Research in Water Power, by Prof. D. Thoma, 45
Measures taken in Sweden against Ice Trouble at Water-Power Plants, by A. F. Samsioe, 463. See 45
Evolution of Opinion on the Control of Hydro-Electric Energy, by M. M. Aerbelot and Dupin, 45
Modern Tendencies in Water-Wheel Design, by H. O. Dahl, 63
Ice Troubles in Norwegian Water Power Plants, by A. Ruths, 73
Recent Swedish Arch Dam Design, by B. Hellström, 76
Historical Note on the Kaplan Turbine, by Dr. J. Kneidl, 183*
Large Low-Head Water-Power Developments, by Dr. F. Lawaczeck, 434*
Construction of Dams, by A. P. Davis, 466

Section C.—Preparation of Fuels.
Complete Gasification of Coal, by Prof. H. Strache, 37
Liquid By-Products of Coal Carbonisation as a Source of Power, by G. Adam, 38
Power Resources of Sweden, by A. F. Enström, 38
Gas Producers, Applications and Economic Features, by A. H. Lymn, 39. See 83
Report on the Distribution of Peat, by Prof. P. F. Purcell, 39
Oil Refining, by C. J. M. Milo, 39
System of Oil Production from Swedish Oil Shales, by S. V. Bergh, 39
Saw Mill Waste in Sweden, by O. Nordström, 39
Power from Wood Waste of Swedish Forests, by Dr. H. von Eckermann, 39
Illumination by Gas, by Dr. J. S. G. Thomas and D. Chandler, 81
Use of Town Gas in Industry, by Sir A. Duckham, 82
Coke as Fuel for Steam Raising, by E. W. L. Nicol, 82
Fuel Conservation and Smoke Abatement, by F. W. Goodenough, 82
Co-Ordination of Fuel Supplies, by Dr. E. W. Smith, 82
Low-Temperature Carbonisation, by Dr. Lander, 82
Fuel Resources of Russia, by Prof. Ramsin, 82
Evolution of the Gas Engine, by Prof. F. W. Burstall, 83

Section D1.—Steam Power Production.
Steam Power Production: General Review of Current Practice, by P. Junkersfeld and G. A. Orrock, 39
Pulverised Fuel for Boilers, by W. M. Selvey, 40
National Economic Power of Solid Fuel in Relation to its Scientific Utilisation, by L. C. Harvey, 40. See *Erratum*, 91
Fuel Economy and the Measurement of High Temperatures, by Sir R. Hadfield, 40
Coke as a Fuel for Steam Raising, by E. W. Nichol, 40
Complete and Incomplete Combustion, with Reference to Combustion Economy, by O. Rodhe, 40*
Combined Furnace and Chain-Grate Stoker for Burning Peat, by Prof. T. Makariew, 41*
Heat Economy in Austria, by Dr. J. Tomaides, 41
German Practice in Exhaust Steam Engineering, by H. Treitel, 41
Steam Generation, by Sir J. Kemnal, 41. See 588
Steam Generation at Extra-High Pressures, by V. Blomquist, 432. See 41
High-Pressure Water-Tube Boilers, by O. A. Wiberg, 181*. See 41
Use of Steam at High Pressures and Temperatures in Central Stations, by W. S. Munroe, 41
Recent Practice in Steam Generation in United States, by D. S. Jacobus, 42
Influence of High Pressure Steam on the Design and Economy of Large Steam Boiler Plant, by Dr. Münzinger, 42

World Power Conference—*continued.*

Section D1.—Steam Power Production—cont.
Power from Mercury Vapour, by W. L. R. Emmet, 42
Steam Accumulation, by Dr. J. Ruths, 68*
State *versus* Private Management of Power Plants, by Dr. A. T. Hadley, 209
Outstanding Features of Swedish Practice in Steam Power Production, by H. A. Lundberg, 503

Section D2.—Steam Utilisation.
Steam Turbines, by Sir C. Parsons, 63*. See 45
Steam Turbines for High Pressures, by C. F. Stork, 69*. See 45
Extra-High Pressure Steam Turbine, by V. Nordström, 178. See 45
Steam Turbines and Condensing Equipment, by F. Hodgkinson, 45
Reciprocal Utilisation of Waste Energy, by B. M. Gerbee, 75

Section E.—Internal-Combustion Engines.
Development of the Diesel Engine, by Dr. Ing. A. Nägel, 110*. See 83
Internal-Combusion Engines for Motor Transport and Aviation, by G. Agnelli, 83, 85
Large Internal-Combustion Engines, by G. F. Tosi, 83
Development of the Internal-Combustion Engine in Sweden, by Prof. E. Hubendick and others, 83, 105
Large Gas Engines in German Power Economy, by P. R. Meyer, 105*. See 83

Section F.—Auxiliary Power Sources.—
Alcohol as a Source of Power, by Sir C. H. Bedford, 77
Calculations Regarding Wind Power Based on Meteorological Data, by Prof. E. Schou, 77
Modern Plants for Wind-Electric Power Stations, by R. J. Jensen, 77
Natural Steam Power Plant, by Prince P. Conti, 78

Section G.—Power Transmission and Distribution.
Modern Practice in Power Transmission and Distribution in Austria, by L. Kallir, 78
Electrification in Holland, by F. A. S. Kicline, 78
Transmission and Distribution of Electric Power in Canada, by Dr. J. C. Smith and Prof. C. V. Christie, 78
Transmission of Electric Power from Norway to Denmark, by W. Rung and A. R. Angelo, 114. See 78
Export of Power from Norway, by S. Kloumann, 213. See 78
Influence of Voltage Regulation on Electricity as a Product of Quality, by Prof. F. Jacobsen, 78
Styrian Water Power and Electricity Co., Development, 78
French High-Tension Electric Power-Transmission Lines, by M. J. T. Laspière, 78
Transmission and Distribution of Electrical Energy, by C. H. Merz, 79
Super-Power, by W. S. Murray, 79
Economic and Technical Organisation of Large-Scale Power Distribution in Sweden, by W. Borgquist, 79
Recent Developments in A.C. Generators and Motor Designs, by R. Liljeblad, 79
Modern A.C. Switchgears in Sweden, by K. E. Eriksson, 80
Characteristics of High-Tension Lines in France, by M. C. Duval, 80
Hungarian Practice in High-Speed Turbo-Alternator Design, by E. Wilczek, 206*. See 80
Recent Electrical Developments in Overhead Electric Transmission in Italy, by U. D. Buono, 80
Development of and Limits in Parallel Operation and Interconnection of Large Electrical Systems, by R. Norsa, 80
High-Tension Cables, by Ll. B. Atkinson, 80. See LETTER, 142. See *Erratum*, 198
Electric Cables for Extra-High Tensions, by L. Emanueli, 80
Loading Limits for Electric Power Cables, by E. Fawssett, S. W. Melsom, C. Vernier and E. B. Wedmore, 81
High-Tension Direct-Current Generation and Distribution of Electrical Energy, by J. S. and W. E. Highfield, 81
American Power-Station Electrical Equipment, by B. G. Lamme, 108
Continuity and Regularity of Operation of Large Electric Systems, by Dr. G. Semenza, 112
Large Alternators, by A. B. Field 565
Development of the Use of Power in Southern Rhodesia, by C. H. Baskerville, 85

Section H.—Domestic and Industrial Uses of Power.
Use of Electricity for Heating Purposes in General, and especially for Domestic Purposes, by Dr. W. Lulofs, 84
Electric Power in Norwegian Households, by J. Sandberg, 84
Technical Development and Financial Organisation, Including Co-operative Schemes for Electricity Supply in Agriculture in Denmark, by F. H. Krebs, 84
Power in the Iron and Steel Industry in America, by E. R. Shover, 84
Application of Electric Power in German Industry, by Dr. C. Köttgen, 85
Electric Power Plant in the Textile Industry, by L. Kuhl, 85
Application of Power to Paper Making in United States, by A. H. White, 85
Electricity Supply in Bergen, by A. Bjerke and E. Monsen, 85

World Power Conference—*continued.*
Section H.—Domesti- and Industrial Uses of Power—continued.
Electrical Undertakings in Japan, by N. Shibusawa, 85
Electricity Supply in Kristiania, by R. Steen, 85
Utilisation of the Power Resources of Austria, with Special Reference to the Consumption of Electric Power, by E. Karel, 85
Notes on the Future of Electric Supply and Demand, by Sir A. B. W. Kennedy, 85
Utilisation of Electric Power in Bulawayo and District, by B. K. Ward, 85
Power for Textile Mills in United States, by C. T. Main, 85
Utilisation of Power in Canada, by P. T. Davies, 85
Electro-Farming Economics, by R. B. Matthews, 116
Electricity in Agriculture, by Dr. H. Wallem, 116
Electricity in Sweden, by N. Ekwall, 116
Section J.—Electro-Chemistry and Electro-Metallurgy.
Report on the Austrian Electro-Chemical Industry, by Dr. H. Paweck, 116
Report on Nitrogen Fixation, by Dr. B. F. Halvorsen, 116
Power in Electro-Chemical and Electro-Thermal Industries, by F. A. J. Fitzgerald, 116
New Resistance Furnace with Reaction Zone, by T. Holmgren, 116
Small Water Powers and Electro-Thermal and Electro-Chemical Loads, by G. Boex, 116
Electrolytic Iron, by T. W. S. Hutchins, 117
Electro-Metallurgy in Italy, by F. Giolitti, 117
Electro-Chemical Industry of Sweden, by Prof. W. Palmgren, 117
Electrical Engineering as Leading Factor in Development of Modern Steelworks, by W. Geyer, 117
Power in Electro-Metallurgy in United States, by E. P. Mathewson, 117
Section K1.—Power for Rail Transport.
Financial Aspects of Main-Line Electrification, by Sir P. Dawson, 117
Electrification of Australian Federal Railways, by Dr A. Hruschka, 117
Internal-Combustion Engines for Transportation, by C. E. Lucke, 117
New System for Main-Line Electrification, by L. de Verebély, 118
Power Questions Relating to Swedish Tramways, by A. Hultquist, 118
Main-Line Electrification on German State Railways, by Dr. W. Wechman, 118
Development of Railway and Tramway Traction, by Prof. I. Franco, 118
Application of Power to Rail Transport: Electric Railways in Great Britain, by R. T. Smith, 118
Electrification of the Dutch East Indies, by Dr. G. de Gelder, 118

World Power Conference—*continued.*
Section K1.—Power for Rail Transport—continued.
Electrification of Railways in Norway, by H. J. Schreiner, 118
Power Problems of Swedish Railways, by I. Ofverholm, 118
Section K2.—Power for Water Transport.
Opening Address by Sir W. S. Abell, 118
Shipowners and Shipbuilders, by Lord Inchcape, 119
Sea Speeds and their Costs, by A. Gray, 119
Hull Resistance and Power for Propulsion, by G. S. Baker, 119
Fuels and their Supply for Sea Transport, by F. J. Leathers, 119
General Data on the Propulsion of Ocean-Going Ships in Holland, by W. J. Muller, 119
Development and Present Position of the Motor Ship, by A. P. Chalkley, 119
Four-Stroke Type of Diesel Engine for Motor Ships, 120
Two-Cycle Diesel Engines, by R. Traill, 120
Present Practice in the Application of Power for Marine Purposes in America, by W. T. Donnelly, 120
Electric Transmission of Power for Propelling Machinery, by W. J. Belsey, 120
Power for Ship Propulsion, by H. G. Hammar, 148. See 120
Reversing-Clutch Marine Turbine, by A. O. Wiberg, 144*. See 120
Diesel Auxiliary Machinery in Connection with Marine Propulsion, by R. W. Allen, 121
Section K3.—Power for Transport (Road Transport and Aviation).
Power Applied to Road Transport, by Col. R. E. Crompton, 85
Application of Power to Air Transport, by A. Ogilvie, 85
Variable Transmission Gears, by Dr. H. S. Hele-Shaw, 86
Influence of Road Conditions on the Development of the Modern Motor Vehicle, by H. G. Burford, 87, 874*
Section L.—Illumination.
International Co-ordination in Illumination, by J. W. T. Walsh., 77
National and International Aspects of Illuminating Engineering, by L. Gaster, 77
Progress in Electrical Illumination, by C. W. Sully, 77
Section M.—Economic Aspects of Power Resources.
Power Policy of Sweden, by C. Kleman, 35
Economics of World Power, by Sir P. A. M. Nash, 35
Effect of Depreciation Currencies and International Financial Conditions on Power Development within the British Empire, by Sir E. Harvey, 35
Social Aspect of World Power Developments, by F. R. Low, 36
Financing of Loans for Power Development, by B. Stuevold-Hansen, 36

World Power Conference—*continued.*
Section M.—Economic Aspects of Power Resources—continued.
Power Development in Relation to Human Progress, by J. H. Barnes, 36
International Joint Commission and the International Water Powers of Canada, by L. J. Burpee, 37
Power Station Legislation in France, by MM. Domergue and Lecat, 37
Electricity Supply in Netherlands, by J. G. B. Spruyt and Dr. E. A. Shoon, 37
Relation of Power Development to Industrial and Economic Progress, by General G. E. Tripp, 37
Private *versus* Public Ownership and Operation, by Dr. A. T. Hadley, 37
Public Utility Regulation in the United States, by C. D. Jackson, 37
Legislation, Electricity Supply in New Countries, by Prof. J. N. van der Ley, 37
Government Policies in Relation to Power Development and Distribution, by Dr. H. Hoover, 37
Section N1.—Research.
Organisation of Research Work in Sweden, by Dr. A. F. Enström, 115
Report by the Austrian Laboratories for Technical Research and Testing Materials, 115
Section N2.—Standardisation.
Standardisation, National and International, by C. le Maistre, 121
International Standardisation in the Field of Power, by A. E. Kennelly, 121
Proposal for Uniform Rules for Testing Water-Power Plants, by G. Sundby, 145
Standardisation in Austria, by Dr. J. Tomaïdes, 121
Industrial Standardisation in Sweden, by A. Kruse, 121
Standardisation in Germany, by Dr. F. Neuhaus, 149. See 121
International Technical Co-operation, by Dr. G. Exner, 121
Electrical Standardisation in the Dutch East Indies, by C. D. Volker, 121
Standardisation and Control of Electrical Accessories and Household Appliances, by H. Grosch, 121
Considerations as to the most Economical Ratio of Increase in a Series of Standardised Main Dimensions, by Dr. J. Goudriaan, 121
Section N3.—Technical and Commercial Education.
Training of the Apprentice, by Dr. A. P. Laurie and Prof. F. G. Bailey, 122
Training of the Engineer of the Future, by A. P. M. Fleming, 122
Influence of Broadcasting, by J. C. W. Reith, 122
Education of the Engineer in the Netherlands and their Colonies, by Prof. A. Van Royen, 122
Elementary Engineering Education, by N. Fredriksson, 122

World Power Conference—*continued.*
Section N3.—Technical and Commercial Education—continued.
Swedish Technical and Commercial Education Institutes, by Dr. H. M. Pleijel, 122
Co-operation of Industry with Technical Schools, by Prof. C. Matschoss, 122
Technical and Commercial Education in Esthonia, 122
World Power, Economics of, 35
Worm Gearing. See *Gear; Gearing*
Worshipful Company of Fanmakers, Police-Court Ventilation Prize, 754
Worthington Pump and Machinery Corporation, Diesel Engine, 482*
Worthington-Simpson, Ltd., Turbine Pumps, Fire Protection, 153*; Feed-Water Heater and Pump for Locomotives, 478*; Vertical Duplex Pump for Oil Fuel, 856*
Wreck Raising. See *Salvage*
— See *Accidents*
Wrenches, Adjustable (Buck & Hickman, Ltd.), 113*
Wrought Iron. See *Iron*
Wylie, M., & Co., Ltd., Box Nailing and Wood-Printing Machines, 544*
Wynne, A. E., on Design of Arch Centres, 257*

X.

X-RAYS. See *Röntgen Rays*
Xylonite Models, Stress Determination. See *Optical*

Y.

YARD, Standard, Design of, 128*
Yarrow & Co. (1922), Ltd., Boilers, Londonderry Power Station, 177*; Boilers, Warship Propulsion, 458*; Naval Exhibits, British Empire Exhibition, 458*. See LETTER, 486; Flap System, Propulsion of Shallow-Draught Steamers, 459. See LETTER, 486
Yarrow Type Boilers, Brighton Corporation Power Station, 372*. See 415
Year Books. See LITERATURE INDEX
York, Automatic Telephones, Strowger System, 862
Yule, G. U., on Statistical Method of Scientific Investigation, 709. See 701, 746, 810

Z.

Z.R.3, U.S. Airship, Transatlantic Voyage, 548
Zinc Alloys. See *Alloys* under *Metallurgy*
— Coating, Galvanised Iron, Methods of Testing, 825*
— — Schoop Spraying Process, 409
— — Sherardising Process, Inception and Development, 277*
— Smelting, Resistor Furnaces, for 449
— Prices. See *Metal-Price Diagrams*

ONE-PAGE AND TWO-PAGE PLATES.

PLATE.

I. British Empire Exhibition, Pumps and Pumping Machinery: Duplex Pump with Twells Valve Gear; Vertical Piston-Cooling Pump; Vertical Duplex Steam Pump (Hayward-Tyler & Co., Ltd.) (facing page 4)

II. British Empire Exhibition, Pumps and Pumping Machinery: 3-in. Opposed Impeller Extraction Pump; 10-in. Low-Lift Circulating Pump; Multi-Stage High-Lift Pump (Mirrlees, Watson Co., Ltd.) (facing page 5)

III. British Empire Exhibition, Sentinel-Cammell Steam Rail Motor: General View of Coach and Views of Interior (Cammell Laird & Co., Ltd.) (facing page 8)

IV. British Empire Exhibition, Control Trailer Car for Metropolitan Railway: Side and End Elevations; Plan and Cross Section, and Plans of Bogie and Underframe (Metropolitan Carriage, Wagon and Finance Co., Ltd.) (between pages 8 and 9)

V. British Empire Exhibition, Control Trailer Car for Metropolitan Railway: Exterior View and Views of Compartments (Metropolitan Carriage, Wagon and Finance Co., Ltd.) (facing page 9)

VI. British Empire Exhibition, Textile Machinery: Views of Hand-Power Roller Gin; Single-Action and Double-Action Macarthy Gins; Hand and Power Saw Gins; Hopper Bale Breaker; Hopper Opener; Hopper Feeding Machine; and Crighton Opener (Platt Brothers & Co., Ltd.) (facing page 12)

VII. British Empire Exhibition, Automatic Sub-Station Gear: Views of High and Low Tension Gear for Rotary Converter and of Gear Controlling Rotary Converters on Traction Service (British Thomson-Houston Co., Ltd.) (facing page 13)

VIII. Docks, New Gladstone, Liverpool; Views of Branch No. 1 during Excavation; Sheet Pile Dam; Inner Face of Three-Storey Shed; Shed during Erection, showing Concrete Towers; and Lock Gates during Erection (between pages 48 and 49)

IX. British Empire Exhibition, Textile Machinery: Carding Engines (E. Ashworth and Wm. Tatham, Ltd.) (facing page 90)

X. British Empire Exhibition, Textile Machinery: Views of Slubbing, Intermediate and Roving Frame (Brooks & Doxey (1920), Ltd.) and of Flyer Frame (Asa Lees & Co., Ltd.) (between pages 90 and 91)

XI. British Empire Exhibition, Textile Machinery: Views of Ring Doubling Frame (Brooks & Doxey (1920), Ltd.) and of Winding Frame (Arundel, Coulthard & Co., Ltd.) (between pages 90 and 91)

XII. British Empire Exhibition, Textile Machinery: Views of Sliver Lap and Ribbon Lap Machines and Nasmith Comber (J. Hetherington & Sons, Ltd.) (facing page 91)

XIII. Humber River Development Scheme, Newfoundland: 14,000-h.p. Hydraulic Turbines for Deer Lake Power Station; Views of Discharge Bend and Governor and of Guide-Vane Control Gear (Sir W. G. Armstrong, Whitworth & Co., Ltd.) (facing page 126)

XIV. Humber River Development Scheme, Newfoundland: Map and View of Corner Brook (Sir W. G. Armstrong, Whitworth & Co., Ltd.) (between pages 126 and 127)

XV. Humber River Development Scheme, Newfoundland: Views showing Down-Stream End of Eastern Section of Canal, Large Fill at Glide Erook Depression, and Dam in Course of Construction (Sir W. G. Armstrong, Whitworth & Co., Ltd.) (between pages 126 and 127)

XVI. Humber River Development Scheme, Newfoundland, Electrical Gear: Views of 10,250-kv.-a. Alternator with Exciter; 2,600-h.p. Synchronous Motor; Stator and Rotor of 10,250-kv.-a. Alternator, and 66,000-volt Oil Circuit Breaker (British Thomson-Houston Co., Ltd.) (facing page 127)

XVII. British Empire Exhibition: Third-Class Vestibule Carriage, L. M. & S. Railway; Elevations and Plans of Body and Underframe (between pages 162 and 163)

XVIII. Cable-Laying Steamer "Edouard Suenson," Great Northern Telegraph Co. of Denmark: Elevation and Deck Plans and Sections of Main Engine; Valve-Setting Diagram (Royal Danish Dockyard) (between pages 196 and 197)

XIX. Queenston-Chippawa Water-Power Development: Views of Canal in Rock Section; of Canal showing Bridges; and of Whirlpool Section (facing page 220)

XX. Queenston-Chippawa Water Power Development: Views of Power House and Transformer Station from U.S. Bank; of Forebay and Power House, and of Control Gate (facing page 221)

PLATE.

XXI. British Empire Exhibition, Colliery Switchgear: Views of Nine-Panel, Flame-Proof, Three-Phase Switchboard; 40-h.p., Oil-Immersed, Lever-Operated Controller; 120-h.p., Oil-Immersed, Wheel-Operated Controller; Pillar-Type Control Gear; Three-Phase, Flame-Proof Rotor Starter; Switch and Resistances for Rotor Starter; and Three-Phase Gate-End Box (Mavor & Coulson, Ltd.) (facing page 224)

XXII. British Empire Exhibition. Coal Cutters and Conveyors: Views of Compressed-Air, Chain-Type Coal Cutter and of Compressed-Air Jigging Conveyor (Diamond Coal Cutter Co., Ltd.); Views of Arcwall Electric Chain-Type Coal Cutter, Direct-Coupled Shaker Conveyor, and Diagrammatic Plan of Longwall Conveyor Working (Mavor & Coulson, Ltd.); View of Siskol Coal Cutter (International Channelling Machines, Ltd.) (facing page 225)

XXIII. British Empire Exhibition, Textile Machinery: Views of Nelson No. 3 Dobby (J. Hill & Sons (Keighley), Ltd.), and of Loom for Fancy Dress Goods (W. B. White & Sons, Ltd.) (facing page 248)

XXIV. British Empire Exhibition, Textile Machinery: Views of Cloth Folding and Measuring Machine (Hacking & Co., Ltd.); of Circular Box Loom (D. Sowden & Sons, Ltd.); and of Jacquard Machine (Richardson, Tuer & Co., Ltd.) (facing page 249)

XXV. Queenston-Chippawa Water Power Development: Views of Interior of Generating Room; of No. 2 Generator; and of Passage-Way to Turbine Glands (facing page 256)

XXVI. Bridge, Reinforced Concrete, over Salmon River, Pulaski, N.Y.: General Views of Bridge and Centring (facing page 257)

XXVII. British Empire Exhibition: 42-Ton Hopper Wagon for Bengal-Nagpur Railway; Elevations, Plan and Details of Construction (Midland Railway Carriage and Wagon Co., Ltd.) (between pages 280 and 281)

XXVIII. Machine Tool and Engineering Exhibition: Views of 18¼-in. Centre Sliding, Surfacing and Screw-Cutting Lathe (Selson Engineering Co., Ltd.); 13-in. Centre General-Purpose Lathe (C. Redman & Sons, Ltd.); 3¼-in. Centre Long-Bed Lathe (Drummond Bros., Ltd.) (facing page 310)

XXIX. Machine Tool and Engineering Exhibition: Views of 36-in. Vertical Turret Lathe and 42-in. Double-Ram Vertical Boring Mill (Webster & Bennett, Ltd.) (facing page 311)

XXX. Machine Tool and Engineering Exhibition: Views of Horizontal Surfacing, Boring, Drilling and Tapping Machine; Boring Machine arranged for Gear Cutting; Gear Hobbing Attachment; Grinding Attachment; and of Controls (H. W. Kearns & Co., Ltd.) (facing page 314)

XXXI. Machine Tool and Engineering Exhibition: Views and Elevations of 36-in. Sensitive Geared Radial Drilling Machine; of 25-in. All-Geared Upright Drilling Machine; and of Multiple-Spindle All-Geared Drilling Machine (A. A. Jones & Shipman, Ltd.) (between pages 314 and 315)

XXXII. Machine Tool and Engineering Exhibition: 12-in. High-Speed Precision Drills; Elevations of Four-Spindle Type, View of Bench Type, and Details of Construction (F. Pollard & Co., Ltd.) (facing page 315)

XXXIII. Machine Tool and Engineering Exhibition: Views of Vertical and Horizontal Spindle Plano-Milling Machines (Kendal & Gent (1920), Ltd.) (facing page 318)

XXXIV. Machine Tool and Engineering Exhibition: Surface-Grinding Machines; Views of General Purpose and Limited Purpose Vertical Spindle Grinders, and of Planetary Head, Horizontal Grinder (Lumsden Machine Co., Ltd.) (facing page 319)

XXXV. Machine Tool and Engineering Exhibition: Views of 7½-in. Centre Geared-Head Lathe (Colchester Lathe Co.); 7-in. Tool-Room Lathe (Holbrook & Sons); 10-in. Combination Turret Lathe (H. W. Ward & Co., Ltd.); and 8¼-in. Centre Lathe (Selson Engineering Co., Ltd.) (facing page 356)

XXXVI. Machine Tool and Engineering Exhibition: Views of 9-in. Combination Turret Lathe (J. Holroyd & Co., Ltd.), and Sundstrand Stub Lathe (Rockford Tool Co.) (facing page 357)

XXXVII. Machine Tool and Engineering Exhibition: Views of Pulley Lathe (Ward, Haggas & Smith); Multiple-Spindle Sensitive Drill (Smith & Coventry, Ltd.); and 7-ft. Radial Drill with Tapping Spindle (W. Asquith (1920), Ltd.) (facing page 358)

XXXVIII. Machine Tool and Engineering Exhibition: Views of 6-ft. Central Thrust, Radial Drill; Vertical Drilling Machine and Girder Radial Drill (W. Asquith (1920), Ltd.); Views of 4-ft. 6-in. Radial Drill, Sensitive Radial Drill, Gang Drill for Motor-Car Axles and Heavy Duty Multiple Drill (J. Archdale & Co., Ltd.); View of 5-ft. 3-in. Radial Drill (Crossley & Co.) (between pages 358 and 359)

PLATE.

XXXIX. Machine Tool and Engineering Exhibition: 30-in. Shaping Machine; Elevations, General View and Details (Selson Engineering Co., Ltd.) (facing page 359)

XL. Machine Tool and Engineering Exhibition Views of Bateman High-Speed Planing Machine (Ward, Haggas & Smith), and 16-ft. Planing Machine (Butler Machine Tool Co., Ltd.) (facing page 362)

XLI. Machine Tool and Engineering Exhibition: Views of 100-in. Width Hiloplane (J. Stirk & Sons, Ltd.); 14-in. Slotting Machine and 10-in. Puncher Slotter (Butler Machine Tool Co., Ltd.) (facing page 363)

XLII. Machine Tool and Engineering Exhibition: Views of 4-ft. Boring Mill (Smith & Coventry, Ltd.); and Vertical Milling Machine (Kendall & Gent (1920), Ltd.) (facing page 398)

XLIII. Machine Tool and Engineering Exhibition: Vertical Automatic Machine; Side and End Elevations and Details (T. Ryder & Son, Ltd.) (facing page 399)

XLIV. Machine Tool and Engineering Exhibition: Views of 9¼-in. Centre All-Geared Lathe (Colchester Lathe Co.); 8¼-in. Centre All-Geared Lathe, 12-in. Centre Surfacing Lathe, and 6½-in. Centre Relieving Lathe (Dean, Smith & Grace (1908), Ltd.) (facing page 400)

XLV. Machine Tool and Engineering Exhibition: Views of 12-in. Worm Gear Generator (Smith & Coventry, Ltd.); and 4-ft. Worm Wheel Hobbing Machine (J. Holroyd & Co., Ltd.); General View and View of Working Head of Double Gear-Tooth Grinder (Fellows Gear Shaper Co.) (facing page 401)

XLVI. Machine Tool and Engineering Exhibition: Views of Internal Grinder (Heald Machine Co.); and of Coventry Centreless Grinder; (Birmingham Small Arms Co., Ltd.) (facing page 404)

XLVII. Machine Tool and Engineering Exhibition: Views of Worm Grinding Machine and Woodworkers' Cutter Grinder (J. Holroyd & Co., Ltd.); and of Rapidor Saw-Blade Sharpening Machine (E. G. Herbert, Ltd.) (facing page 405)

XLVIII. Machine Tool and Engineering Exhibition: 14-in. Ball-Bearing Sensitive Drilling Machine; General View, Elevations, and Sections of Gear-Box (F. Pollard & Co., Ltd.) (facing page 406)

XLIX. Machine Tool and Engineering Exhibition: Views of 3-cwt. Single-Blow Pneumatic Hammer and 10-cwt. Pneumatic Stamp (B. & S. Massey, Ltd.); Views of Forging Machine (Selson Engineering Co., Ltd.) (facing page 407)

L. Dock, Dry, Canadian Government, at Esquimalt, British Columbia: General and Contour Plans; Plan and Cross-Sections of Dock and Details (between pages 448 and 449)

LI. British Empire Exhibition: Royal Saloon Coach for H.M. the King of Egypt; Elevations, Plans and Sections of Coach and Underframe (Metropolitan Carriage, Wagon & Finance Co., Ltd.) (between pages 476 and 477)

LII. Coke Ovens, Piette, at Shelton Ironworks: Views of Ovens, Coke Hearth, and Robins Conveyor (Semet-Solvay & Piette Coke Oven Co., Ltd.) (facing page 512)

LIII. Coke Ovens, Piette, at Shelton Ironworks: Views of Charging Machine (M. B. Wild & Co., Ltd.), and Oven Face on Ram Side (Semet-Solvay & Piette Coke Oven Co., Ltd.) (facing page 513)

LIV. British Empire Exhibition: Palm Oil-Extracting and Kernel-Separating Plant for Nigeria: Views of Complete Plant; of Digester and Centrifugal Separator; and of Rotary Drier (Manlove, Alliott & Co., Ltd.) (facing page 514)

LV. British Empire Exhibition: Palm Oil-Extracting and Kernel-Separating Plant for Nigeria; Views of Kernel-Separating Plant, and of Nut-Cracking Machines and Kernel-Separating Tank (Manlove, Alliott & Co., Ltd.) (facing page 515)

LVI. Steamer "Orama," Twin-Screw Geared Turbine, Orient Line: Profile and Deck Plans (Vickers, Ltd.) (between pages 542 and 543)

LVII. Steamer "Orama," Twin-Screw Geared Turbine, Orient Line: Deck and Hold Plans (Vickers, Ltd.) (between pages 542 and 543)

LVIII. Motor-Car Exhibition, Olympia: 20-h.p. Six-Cylinder Rolls-Royce Motor Car; Views of Gear Box and Controls; Rear End of Chassis and Engine (Rolls-Royce, Ltd.) (facing page 576)

LIX. Motor-Car Exhibition, Olympia: 10-25-h.p. Four-Cylinder Motor-Car Engine; Longitudinal and Transverse Sections and End Elevation (Dorman & Co., Ltd.) (between pages 576 and 577)

LX. Motor-Car Exhibition, Olympia: 9-18-h.p. Four-Cylinder Motor-Car Engine; Longitudinal and Transverse Sections and End Elevation (Dorman & Co., Ltd.) (between pages 576 and 577)

PLATE.

LXI. Motor-Car Exhibition, Olympia: Motor-Car Chassis with 8-20-h.p. Overhead Valve Engine; General View, Elevation and Plan (Gwynnes Engineering Co., Ltd.) (facing page 577)

LXII. Steamer "Orama," Twin-Screw, Geared Turbine, Orient Line, Machinery: View of Gearing and Turbine with Covers Removed; Side View of Turbine Set with Condenser in Position (Vickers, Ltd.) (facing page 600)

LXIII. Steamer "Orama," Twin-Screw Geared Turbine, Orient Line, Machinery: Longitudinal Section, Plan and Transverse Sections of Turbine Room; Longitudinal Section and Plan of Boiler Room (Vickers, Ltd.) (between pages 600 and 601)

LXIV. Steamer "Orama," Twin-Screw, Geared Turbine, Orient Line, Machinery: Views of Turbine Set from Gear Box and Forward End (Vickers Ltd.) (facing page 601)

LXV. Dam, Santa Chiara di Ula, Tirso River, Sardinia: Views showing Mutiple Arch Decking and Downstream Face of Buttresses during Construction (facing page 634)

LXVI. Dam, Santa Chiara di Ula, Tirso River, Sardinia: Views during Construction (between pages 634 and 635)

LXVII. Dam, Santa Chiara di Ula, Tirso River, Sardinia: Views of Completed Dam (between pages 634 and 635)

LXVIII. Dam, Santa Chiara di Ula, Tirso River, Sardinia: Views Looking down on High Level Road and of Downstream Face (facing page 635)

LXIX. Penang Hills Railway: Views of Cutting on Lower and Upper Sections; Viaduct on Upper Section, and 40-ft. Arch on Lower Section (Federated Malay States Railways) (facing page 666)

LXX. Penang Hills Railway: Views of Piers for Viaduct, Centring for 40-ft. Arch, and Viaduct under Construction (Federated Malay States Railways) (between pages 666 and 667)

LXXI. Penang Hills Railway: Views of 40-ft. Arch and Viaducts (Federated Malay States Railways) (between pages 666 and 667)

LXXII. Penang Hills Railway: Views of Tunnel Faces and from Inside of Tunnel (Federated Malay States Railways) (facing page 667)

LXXIII. Turbine, Steam, Geared, 1,000-kw., and Continuous-Current Dynamo: Views of Set from Commutator End and from Steam End (English Electric Co., Ltd.) (facing page 698)

LXXIV. Turbine Shops, Brush Electrical Engineering Co., Ltd.: Views of Shop from Heavy-Machine End and from Erecting End (facing page 699)

LXXV. Turbine Shops, Brush Electrical Engineering Co., Ltd.: Views of Boring Machine Boring Turbine Casing and Facing Condenser Flange (H. W. Kearns, Ltd.) (facing page 700)

LXXVI. Turbine Shops, Brush Electrical Engineering Co., Ltd.: Views of Work Plate in Machine Shop, and of Brush-Ljungström Turbines on Test Bed (facing page 701)

LXXVII. Steamer "Shoho Maru," Japanese Train Ferry: Profile and Deck Plans; Views of Vessel and of Wagon Deck (Uraga Dock Co.) (between pages 734 and 735)

LXXVIII. Bridge, Strauss Bascule, Bann River Coleraine, Ireland: Views showing Bridge from Londonderry Side and from Coleraine Side (Sir W. G. Armstrong, Whitworth & Co., Ltd.) (facing page 758)

LXXIX. Bridge, Strauss Bascule, Bann River, Coleraine, Ireland: General Elevation and Plan; Elevation Plan and Section of Bascule Span; Details of Piers and Ferro-Concrete Piles; Details of Operating Machinery (Sir W. G. Armstrong, Whitworth & Co., Ltd.) (between pages 758 and 759)

LXXX. Bridge, Strauss Bascule, Bann River, Coleraine, Ireland: Views of Derrick Car and of Structure during Erection; View of Bascule Span (Sir W. G. Armstrong, Whitworth & Co., Ltd.) (facing page 759)

LXXXI. Locomotive, 2-8-8-2 Type, Simple Articulated, Chesapeake and Ohio Railroad: General View and Elevation of Engine; Longitudinal Section and Details of Boiler (American Locomotive Co.) (between pages 794 and 795)

LXXXII. Turbines, Steam, Geared, for S.S. "Drottningholm," formerly "Virginian": End Elevation and Longitudinal Section of High-Pressure Turbine; Longitudinal Section of Low-Pressure Turbine; Details of Gearing; Transverse Section and Plan of Machinery Room (Aktiebolaget de Lavals Angturbin) (between pages 840 and 841)

LXXXIII. Aero-Engine, 385-h.p. Jaguar, Static Radial Air-Cooled: Front and Rear Views of Engine; Transverse and Longitudinal Sections; Details of Pistons and Connecting Rods; Details of Timing Gear; Section and Plan of Cylinder Head showing Valves (Armstrong-Siddeley Motors, Ltd.) (between pages 870 and 871)

LETTERS TO THE EDITOR.

Illustrated Subjects are Marked with an Asterisk after the Number of the Page.)

ACCIDENTS, Industrial, Statistical Investigation, Industrial Fatigue Research Board. R. E. Roper, 746; A. Jude, 810
Aerodynamics, Flettner Rotor Ship, Principle of. A. R. Low, 831*
Aerodynamics, Skin Friction, Theory of. B. G. v.d. Hegge Zynen, 831*
Aeronautical Engineers, Remuneration of. R. Hazleton, 862
Aeronautics, Theory of Skin Friction. B. G. v.d. Hegge Zynen, 831*
Air Compressors, Flow Indicator for Cooling Systems. C. L. Stokoe, 548
Air Ministry, Remuneration of Engineers. R. Hazleton, 862
Alternating-Current Rectifier, the Transverter. Major A. M. Taylor, 14
Apprentices, Dockyard, and the Whitworth Scholarships. See *Whitworth*
Australia, Sydney Harbour Bridge, Design of. J. A. Saner, 198

BEARINGS, Michell, Cold-Rolling Mills. H. T. Newbigin, 769*
Boiler Firing, Advantages of Pulverised Fuel. L. Harvey, 198
Boiler Trials, Standardisation of Testing Methods. "Thermal," 101; D. Brownlie, 102
Bridges, London, Timber Foundations, Decay of. J. V. Shaw, 676
Bridge, Sydney Harbour, Design of. J. A. Saner, 198
Bridge, Waterloo, Proposed Reconstruction. W. H. Thorpe, 102
Bridge, Waterloo, Timber Foundations, Decay of. J. V. Shaw, 676
Brinell Hardness Tests, Rapid Evaluation of Numbers. R. C. Gale, 486
Burmese Iron Wood, Resistance to Teredo. A. L. Howard, 548

CABLES, Electric, Maximum Potential Gradients. Major A. M. Taylor, 142. See *Erratum*, 198
Canada, Fuel Resources. B. F. Haanel, 102
Canada, Supply of Silica Sand. G. G. Ommanney, 334
Cavitation in United States Warships. W. Sisson, 769
Celluloid Models, Optical Determination of Stresses. See *Optical*
Class Warfare, Futility of. R. E. Crompton, 746
Clay, London, Properties of. Prof. E. R. Matthews, 676
Cleaning Water Mains, Advantages of Victaulic Joints. F. M. Wright, for the Victaulic Co., Ltd., 14
Clearance Volume, Engine Cylinders, Determination of. P. H. Schweitzer, 101*
Coal, Pulverised. See *Pulverised Fuel*
Cold-Rolling Mills, Michell Bearings for. H. T. Newbigin, for Michell Bearings, Ltd., 769*
Colleges, Technical, Training of Teachers. W. Booth, 166
Cooling Systems, Water, Monitor Flow Indicator. C. L. Stokoe, 548
Costs, Technical and Estimates. A. Miller, 582. See 433
Cylinders, Engine, Determination of Clearance Volume. P. H. Schweitzer, 101*

DEGREES, Engineering, London University. "Practice and Theory," 831
Discs, Rotating, Conical Profile, Stresses in. E. Honegger, 486
Dissociation in Gaseous Explosions. See *Engines, Gas, Missing Pressure and Heat Losses*
Dockyard Apprentices and the Whitworth Scholarships. See *Whitworth*
Draughtsman, Locomotive, Salary and Status. Experto Crede, 769
Dust, Electrical Precipitation. O. Lodge, 676

EDUCATION. London University Degrees in Engineering. "Practice and Theory," 831
Education, Training of Engineering Teachers. W. Booth, 166
Education, Whitworth Scholarships. See *Whitworth*
Electric Cables, Maximum Potential Gradients. Major A. M. Taylor, 142. See *Erratum*, 198
Electric Transverter for High-Tension, Direct-Current Power Transmission. Major A. M. Taylor, 14
Electrical Precipitation, Smoke and Fumes. O. Lodge, 676
Engine and Boiler Trials, Standardisation. "Thermal," 101; D. Brownlie, 102
Engines, Gas, Missing Pressure and Heat Losses. W. T. David, 641, 746; D. R. Pye, 704
Engines, Internal-Combustion, Determination of Clearance Volume. P. H. Schweitzer, 101*
Engines, Internal-Combustion, Flow Indicator for Cooling Systems. C. L. Stokoe, 548
Engines, Internal-Combustion, Indicator Connections. J. Okill, 424
Engines, Steam, Determination of Clearance Volume. P. H. Schweitzer, 101*
Engineering Degrees, London University. "Practice and Theory," 831
Engineering Education and the Whitworth Scholarships. See *Whitworth*
Engineering Teachers, Training of. W. Booth, 166
Engineers, Remuneration of. Experto Crede, 769; R. Hazleton, 862
Erste-Brunner Steam Turbine, Efficiency of. O. Wiberg, 142
Estimates and Technical Costs. A. Miller, 582. See 433
Explosions, Gaseous, Missing Pressure and Heat Losses in. See *Engines, Gas*

FACTORY Accidents. See *Accidents*
Fatigue, Industrial, Research Board, Statistical Investigation of Industrial Accidents. See *Accidents*
Flettner Rotor Ship. A. R. Low. 831*
Flow Indicator, Water-Cooling Systems. C. L. Stokoe, 548
Foundations, Timber, London Bridges, Decay of. J. V. Shaw, 676
Friction, Skin, in Aeronautics, Theory of. B. G. v.d. Hegge Zynen, 831*
Fuel, Pulverised. See *Pulverised Fuel*
Fuel Resources of Canada. B. F. Haanel, 102
Fumes, Electrical Precipitation. O. Lodge, 676
Furnaces, Industrial, Advantages of Pulverised Fuel. L. Harvey, 198

GAS ENGINES. See *Engines, Gas*
Gaseous Explosions, Missing Pressure and Heat Losses in. See *Engines, Gas*
Government-Trained Students and the Whitworth Scholarships. See *Whitworth*
Grove Road Power Station, Tests of Turbo Generator. F. Samuelson, for the British Thomson-Houston Co., Ltd., 704
Gunboats, Shallow-Draught, Yarrow. "An Old Mud Larker," 486

HARDNESS TESTS, Brinell, Rapid Evaluation of Numbers. R. C. Gale, 486
Heat Engines. See *Engines*
Heat Losses in Gas Engines. See *Engines, Gas*
Heat Treatment, Steel, Calculation of Quenching Stresses. T. McL. Jasper, 641

INDICATOR Connections, Internal-Combustion Engines. J. Okill, 424
Indicator Diagrams, Determination of Clearance Volume from. P. H. Schweitzer, 101*
Industrial Accidents. See *Accidents*
Industrial Fatigue Research Board, Statistical Investigation of Industrial Accidents. See *Accidents*
Internal-Combustion Engines. See *Engines*
Iron Manufacture, Early, Osmunds. H. Littlehales, 486*
Iron Wood, Burmese, Resistance to Teredo. A. L. Howard, 548

LABOUR, Class Warfare, Futility of. R. E. Crompton, 746
Labour Costs, Manufacturing Work, Apportionment. A. Miller, 582. See 433
Labour, Industrial Accidents. See *Accidents*
Labour, Industrial Fatigue Research Board, Statistical Investigation of Industrial Accidents. See *Accidents*
Light, Polarised, Stress Determination by. See *Optical*
Ljungström Steam Turbine, Comparisons with Erste-Brunner Turbine. O. Wiberg, 142
Locomotive Draughtsman, Salary and Status. Experto Crede, 769
London Bridges, Timber Foundations, Decay of. J. V. Shaw, 676
London Clay, Properties of. Prof. E. R. Matthews, 676
London University Degrees in Engineering. "Practice and Theory," 831
Luton Corporation, Stal-Ljungström Turbo Generator, Tests. O. Wiberg, 142

MAINS, Water, Cleaning of, Advantages of Victaulic Pipe Joints. F. M. Wright, for the Victaulic Co., Ltd., 14
Manufacturing Work, Apportionment of Labour Costs. A. Miller, 582. See 433
Marine Propellers, United States Warships, Cavitation with. W. Sisson, 769
Materials, Stresses in, Optical Determination. See *Optical*
Metallurgy, Osmunds, Early Iron Manufacture. H. Littlehales, 486*
Metallurgy, Quenching Stresses, Calculation of. T. McL. Jasper, 641
Michell Bearings, Cold-Rolling Mills. H. T. Newbigin, 769*
Monitor Flow Indicator, Water-Cooling Systems. C. L. Stokoe, 548

NAVY, United States, Scouts and Destroyers, Extent of Cavitation. W. Sisson, 769

OPTICAL Determination of Stresses. E. G. Coker, 462, 769; T. McL. Jasper, 704
Osmunds, Early Iron Manufacture. H. Littlehales, 486*

PATENT Applications, Examiners' Searches. "L. R.," 462
Pipe Joints, Victaulic, and Cleaning of Water Mains. F. M. Wright, for the Victaulic Co., Ltd., 14
Polarised Light, Stress Determination by. See *Optical*
Power Station, Electric, Grove-road, London, Tests of Turbo Generator. F. Samuelson, for British Thomson-Houston Co., Ltd., 704
Power Station, Luton Corporation, Tests of Stal-Ljungström Turbo Generator. O. Wiberg, 142
Power Transmission, High-Tension, Direct-Current, Transverter for. Major A. M. Taylor, 14
Precipitation, Electrical, Smoke and Fumes. O. Lodge, 676
Propellers, Marine, United States Warships, Cavitation with. W. Sisson, 769
Pulverised Fuel Progress and Advantages. L. Harvey, 198

QUENCHING Stresses, Steel, Calculation of. T. McL. Jasper, 641

RADIATION Losses, Gas Engines. See *Engines, Gas.*
Rectifier, Alternating Current, the Transverter. Major A. M. Taylor, 14
Remuneration of Technical Men. Experto Crede, 769; R. Hazleton, 862
Research Board, Industrial Fatigue, Statistical Investigation of Industrial Accidents. See *Accidents*
River Vessels, Shallow-Draught, Yarrow. "An Old Mud Larker," 486
Rolling Mills, Cold, Michell Bearings for. H. T. Newbigin, for Michell Bearings, Ltd., 769*
Rotating Discs, Conical Profile, Stresses in. E. Honegger, 486
Rotor Ship, Flettner, Principle of. A. R. Low, 831*

SAND, Silica, Canadian Supply. G. G. Ommanney, 334
Scholarships, Whitworth. See *Whitworth*
Shallow-Draught River Vessels, Yarrow. "An Old Mud Larker," 486
Ship, Rotor, Flettner, Principle of. A. R. Low, 831*
Silica Sand, Canadian Supply. G. G. Ommanney, 334
Skin Friction, Aeronautics, Theory of. B. G. v.d. Hegge Zynen, 831*
Smoke, Electrical Precipitation. O. Lodge, 676
Socialism and Class Warfare Talk. R. E. Crompton, 746
Stal-Ljungström Turbo-Generator, Luton Corporation, Trials. O. Wiberg, 142
Standardisation of Boiler Testing, "Thermal," 101; D. Brownlie, 102
Steam Engines. See *Engines*
Steam Turbines. See *Turbins*
Steamers, Shallow-Draught, Yarrow. "An Old Mud Larker," 486
Steel, Quenching Stresses, Calculation of. T. McL. Jasper, 641
Stresses, Optical Determination. See *Optical*
Stresses, Quenching, in Steel, Calculation of. T. McL. Jasper. 641
Stresses, Rotating Discs, Conical Profile. E. Honnegger, 486
Sydney Harbour Bridge, Design of. A. J. Saner, 198*

TEACHERS, Engineering, Training of. W. Booth, 166
Technical Colleges, Training of Teachers. W. Booth, 166
Technical Costs and Estimates. A. Miller, 582. See 433
Technical Men, Remuneration of. Experto Crede, 769; R. Hazleton, 862
Teredo, Resistance of Burmese Iron Wood. A. L. Howard, 548
Tests, Boiler, Standardisation of, "Thermal," 101; D. Brownlie, 102
Tests, Hardness, Brinell, Rapid Evaluation of Numbers. R. C. Gale, 486
Tests, Stal-Ljungström Turbo-Generator, Luton Corporation. O. Wiberg, 142
Tests, 15,000 kw. Turbo-Generator, Grove Road Power Station. F. Samuelson, for the British Thomson-Houston Co., Ltd., 704
Thermodynamics, Gas Engines, Missing Pressure and Heat Losses. See *Engines, Gas*
Timber, Burmese, Resistance to Teredo. A. L. Howard, 548
Timber Foundations, London Bridges, Decay of. J. V. Shaw, 676
Transverter, High-Tension Direct-Current Power Transmission. Major A. M. Taylor, 14
Trials, Boiler, Standardisation of Testing Methods. "Thermal," 101; D. Brownlie, 102
Trials, Stal-Ljungström Turbo-Generator, Luton Corporation. O. Wiberg, 142
Trials, 15,000 kw. Turbo-Generator, Grove Road Power Station. F. Samuelson, for the British Thomson-Houston Co., Ltd., 704
Turbine, Steam, 15,000 kw., B.T.H., Grove Road Power Station, Tests. F. Samuelson, for British Thomson-Houston Co., Ltd., 704
Turbines, Steam, Erste-Brunner and Ljungström, Comparisons. O. Wiberg, 142
Turbines, Steam, Rotating Discs, Conical Profile, Stresses in. E. Honegger, 486
Turbo-Generator, 15,000 kw. B.T.H., Grove Road Power Station, Tests. F. Samuelson, for British Thomson-Houston Co., Ltd., 704
Turbo-Generator, Stal-Ljungström, Luton Corporation, Tests. O. Wiberg, 142

UNITED STATES Warships, Cavitation with. W. Sisson, 769
University of London, Degrees in Engineering. "Practice and Theory," 831

VICTAULIC Pipe Joints and Cleaning of Water Mains. F. M. Wright, for the Victaulic Co., Ltd., 14

WARSHIPS, United States, Cavitation in. W. Sisson, 769
Water-Cooling Systems, Monitor Flow Indicator. C. L. Stokoe, 548
Water Mains, Cleaning, Advantages of Victaulic Joints. F. M. Wright, for the Victaulic Co., Ltd., 14
Waterloo Bridge, Proposed Reconstruction. W. H. Thorpe, 102
Waterloo Bridge, Timber Foundations, Decay of. J. V. Shaw, 676
Whitworth Scholarships and Dockyard Apprentices. A. D. Ottewell, 746; M.I.Mech.E., 770; G. Ashworth, 770; W. J. Thomas, 770; J. H. Macdonald, 810; A. H. Couzens, 810; Fitter, 831; Not a B.Sc., 831; F. G. Steed, 861
Wood, Burmese, Resistance to Teredo. A. L. Howard, 548
Works Management, Technical Costs and Estimates, A. Miller, 582. See 433
Workshop Accidents. See *Accidents*

XYLONITE Models, Optical Determination of Stress. See *Optical*

YARROW Shallow-Draught River Vessels. "An Old Mud Larker," 486

LITERATURE.

AERODYNAMICS, German Lectures on, 342
Aeronautical Engineers, Institution, Proceedings, 707
Aeronautics, Jane's All the World's Aircraft, Edited by C. G. Grey, 510
Africa, West, Coast and Bush Life in, by "Coaster," 657
Aircraft, Jane's, All the World's, Edited by C. G. Grey, 510
Alloys and their Industrial Applications, by Prof. O. Bauer, 559
American Submarines, Birth and Development of, by F. T. Cable, 433
Anleitung zur Berechnung einer Dampfmaschine, by Prof. R. Grassmann, 509
Annual, Naval and Shipping, Brassey's, 809
Annuario de Mineria, 235
Applied Elasticity by Dr. J. Prescott, 701
Arc Welding by F. Frimaudeau, 673
Arc Welding Handbook, by C. J. Holslag, 700
Architects' and Builders' Compendium, China, 372
Association Technique Maritime et Aéronautique, Bulletin, 803
Astronomy, Depths of the Universe, by Prof. G. E. Hale, 342
Autobiography of Sir Francis Fox, 714
Automatic Telephone Systems, by W. Aitken, 663
Automatic Telephones, by F. A. Ellson, 238

BIBLIOGRAPHIE de la Relativité, by M. Lecat, 612
Biography of Lord Rayleigh, 700
Blast Furnaces, Combustion in, by Dr. A. Korevaar, 826
Bleaching, History of, by S. H. Higgins, 701
Boilers, High-Pressure Steam Generation, by Dr. F. Munzinger, 238
Books, New, Notes on, 238, 342, 390, 433, 509, 559, 594, 612, 657, 672, 700, 779, 825
Books Received, 132, 238, 337, 372, 496, 525, 557, 590, 620, 657, 673, 701
Brassey's Naval and Shipping Annual, 809
British Corporation Rules and Tables, 738
British Empire Exhibition Guide, 76
British History, Naval Side, by G. Callender, 612
British Oil Engines, by W. A. Tookey, 509
British Warships, Particulars, 69
Buff Book, Sell's, 579
Builders' and Architects' Compendium, China, 372

CADMIUM: Its Metallurgy, Properties and Uses, by Dr. N. F. Budgen, 779
Calculus for Home Study, by Prof. C. I. Palmer, 342
Callendar Steam Tables, Enlarged, 612
Cellulose Chemistry, Text-Book of, by Prof. E. Heuser, translated by C. J. West and G. J. Esselen, 390
Chemical Encyclopedia: A Digest of Chemistry and Chemical Industry, by C. T. Kingzett, 238
Chemical Engineers, Institution of, Proceedings, 512
Chemical Thermodynamics, by Prof. J. R. Partington, 433
Chemistry, Cellulose, Text Book of, by Prof. E. Heuser. Translated by C. J. West and G. J. Esselen, 390
Chemistry, Matter and Change, by W. C. D. Whetham, 559
Chemistry, Natural History of Crystals, by Dr. A. E. H. Tutton, 631
Chemistry, Physical, System of Vol. III Quantum Theory, by Dr. W. McC. Lewis, 825
Chemistry of the Rarer Elements, by Prof. B. S. Hopkins, 336
China Architects' and Builders' Compendium, 372
C. I. F. Contracts, Law as to, by H. Goitein, 238
Civil Engineers' Cost Book, by Col. T. E. Coleman, 779
Civil Engineers of Ireland, Institution of, Transactions, 738
Cold Drawing and Wire Drawing, General Principles, by G. Soliman, 673
Combustion in Gas Producers and Blast Furnaces, by Dr. A. Korevaar, 826
Concrete, Matters Influencing, by Dr. Ing. A. Kleinlogel, 342
Concrete, Reinforced. See *Ferro-Concrete*
Construction Industries, Seasonal Operation and Unemployment, 657
Constructional Ironwork, by Prof. M. Foerster, 826
Contracts, C.I.F., Law as to, by H. Goitein, 238
Control Diagrams, Electrical Machinery, by T. Croft, 825
Control of Electric Motors, by G. Fox, 556
Corrosion, Iron and Steel, Report, 76
Corrosion of Metals, by U. R. Evans, 701
Cosgrove's Handbook of Woodworking Machinery, 700
Cost Book, Civil Engineers', by Col. T. E. Coleman, 779
Costs and Charges, Electric Supply, 779
Costs, Technical, and Estimates, by A. Miller, 433. See LETTER, 582
Costing, Factory, by H. H. Emsley, 673
Crystals, Natural History of, by Dr. A. E. H. Tutton, 631
Cunard Line, Eight Decades of Progress, 133

DAMPFLOKOMOTIVE, by Prof. J. Jahn, 390
Depths of the Universe, by Prof. G. E. Hale, 342
Diagrams, Control, Electrical Machinery, by T. Croft, 825
Diesel-Electric Locomotives in Railway Working, by Dr. Ing. H. Brown, 390
Distillation du Bois, by Prof. G. Dupont, 826
Drawing, Cold, General Principles, by G. Soliman, 673
Drawing, Machine, by Prof. H. J. Spooner, 779
Drawing-Office Problems, Machine Design, by Prof. D. C. Albert, 510
Directory of Engineers, Kelly's, 582
Directory, Merchants, Manufacturers and Shippers, Kelly's, 95
Directory of Paper Makers, 16
Directory of Railway Officials, Universal, 452
Directory of Telegraphic Addresses, Sell's, 451
Directory, Telephone, Sell's Buff Book, 579

EINFLÜSSE auf Beton, by Dr. Ing. A. Kleinlogel, 342
Einstein Theory of Relativity, Bibliography, by M. Lecat, 612
Eisenkonstruktionen der Ingenieur-Hochbauten, by Prof. M. Foerster, 826
Elasticity, Applied, by Dr. J. Prescott, 701
Elasticity and Strength, by Profs. C. Bach and R. Baumann, 559
Elastizität und Festigkeit, by Profs. C. Bach and R. Baumann, 559
Electric Arc Welding, by S. Frimaudeau, 673
Electric Arc Welding Handbook, by C. J. Holslag, 700
Electric Motors, Principles and Control, by G. Fox, 556
Electric, Power Factor, Explanations of, 559
Electrical Contractors' Year-Book, 863
Electrical Machinery and Control Diagrams, by T. Croft, 825
Electrical Measuring Instruments, Part I, Commercial and Indicating Instruments, by Dr. C. V. Drysdale and A. C. Jolley, 337
Electricity Supply Costs and Charges, by H. M. Sayers, 779
Electroplating and Electroforming (Electrotyping), Principles of, by W. Blum and G. B. Hogaboom, 590
Electrotechnics, Manual of, Edited by Prof. Esselborn, 673
Elementary Surveying, by Prof. C. B. Breed and G. L. Hosmer, 433
Elements, Rare, Chemistry of, by Prof. B. S. Hopkins, 336
Encyclopedia, Chemical: Digest of Chemistry and Chemical Industry, by C. T. Kingzett 238
Engineering, Irrigation, Principles of, with Special Reference to South Africa, by F. E. Kanthack, 631
Engineering Management, by P. F. Walker, 664
Engineering, Marine Practice, by Engineer-Commander F. J. Drover, 336
"Engineering News-Record," Jubilee, 34
Engineering, Railroad, by W. G. Raymond, 238
Engineering, Road, by E. L. Leeming, 524
Engineering Work, Sixty-Three Years of, by Sir Francis Fox, 714
Engineering Workshop Notes and Data, 802
Engineers, Directory of, Kelly's, 582
Engineers and Shipbuilders in Scotland, Institution, Papers, 840
Engineers, Thermodynamics for, by Prof. Ewing, French Edition, 657
Engineers, Thermodynamics for, by M. A. Witz, 657
Engines and Machinery, Overseas Trade, by W. Thiemann, 594
Engines, Oil, by A. L. Bird, 190
Engines, Oil, British, by W. A. Tookey, 509
Engines, Steam, Calculations and Design, by Prof. R. Grassmann, 509
Estimates and Technical Costs, by A. Miller, 433. See LETTER, 582
European War, The Merchant Navy, Vol. II, by A. Hurd, 672

FACTORIES, the Modern Foreman, by R. Grimshaw, 390
Factory Costing, by H. H. Emsley, 673
Factory Management, by R. H. Lansburgh, 619
Factory Management, by P. F. Walker, 664
Ferro-Concrete Design, by G. P. Manning, 618
Flat Plates, Strength of, by C. C. Pounder, 612
Foreman, the Modern, by R. Grimshaw, 390
Foundry Work, by W. R. Needham, 673
Foundry Work, Pattern Making, by J. McC. Wilson, 657
Fox, Sir Francis, Autobiography, 714
Furnaces, Blast, Combustion in, by Dr. A. Korevaar, 826

GAS, Natural, Measurement, Compression and Transmission, by L. C. Lichty, 620
Gas Producers, Combustion in, by Dr. A. Korevaar, 826
Gases, Kinetic Theory of, by Prof. Bloch. Translated by P. G. Smith, 559
Gauge Testing, N.P.L., 842
Gauges, Pressure, Indicators, &c., by J. Smith, 612
Gauges, Workshop, and Measuring Appliances, by L. Burn, 826
Gear Measurement, N.P.L., 223
Gesetz des Kraftverlaufs beim Stoss, by Dr. Ing. F. Berger, 826
Glasgow Technical College, Report, 787
Glass Technology, Research Work, 327
Glass Technology, Society of, Proceedings, 518
Ground Water Level, Lowering of, by Dr. Ing. J. Schultze, 673
Grundwasserabsenkung in Theorie und Praxis, by Dr. Ing. J. Schultze, 673

HANDBOOK, Oxy-Acetylene Welders', 33
Handbook, Woodworking Machinery, Cosgrove's, 700
Harbour Works, Deterioration and Preservation of Marine Structures, by W. G. Atwood and A. A. Johnson, 589
History of Bleaching, by S. H. Higgins, 701
History, British, Naval Side, by G. Callender, 612
Höchstdruckdampf, by Dr. F. Münzinger, 238
Hydraulics, Text Book, by Dr. Ing. T. Pöschl, 657
Hydrodynamics, German Lectures on, 342
Hydro-Electric Power Plants, Level Fluctuations in Forebays, by Dr. L. Mühlhofer, 657

IMPACT Phenomena, Laws of, by Dr. Ing. F. Berger, 826
Indicators, Pressure Gauges, &c., by J. Smith, 612
Industrial Management, by R. H. Lansburgh, 619
Industrial Management, by P. F. Walker, 664
Industrial Welfare, Principles of, by J. Lee, 342
Industries, Constructional, Seasonal Operation and Unemployment, 657
Instruments, Electrical Measuring, Part I, Commercial and Indicating Instruments, by Dr. C. V. Drysdale and A. C. Jolley, 337
Instruments, Pressure Gauges, Indicators, Thermometers and Pyrometers, by J. Smith, 612
Invention and Science, Masters of, by F. L. Darrow, 390
Ireland, Civil Engineers of, Transactions, 738
Iron-Carbon System, Theory of, by Dr. E. Heyn, 612
Iron and Steel Institute Proceedings, 518
Iron Structures, Engineering of, by Prof. M. Foerster, 826
Irrigation Engineering, Principles of, with Special Reference to South Africa, by F. E. Kanthack, 631

JANE'S All the World's Aircraft, Edited by C. G. Grey, 510

KELLY'S Directory of Engineers, 582
Kelly's Directory of Merchants, Manufacturers, and Shippers, 95
Kinetic Theory of Gases, by Prof. Bloch. Translated by P. G. Smith, 559

LABOUR, Industrial Welfare, Principles of, by J. Lee, 342
Labour, Unemployment and Constructional Industries, 657
Labour, Is Unemployment Inevitable? An Analysis and a Forecast, 555
Law as to C.I.F. Contracts, by H. Goitein, 238
Legierungen in ihrer Anwendung für gewehrliche Zwecke, by Prof. O. Bauer, 559
Lehrbuch der Elektrotechnik, Edited by Prof. Esselborn, 673
Lehrbuch der Hydraulik, by Dr. Ing. T. Pöschl, 657
Lehrbuch der Technischen Physik, by Prof. G. Gehlhoff, 779
Lloyd's Register of Shipping, 166
Locomotive Construction, Swiss, 261
Locomotives, Diesel-Electric, in Railway Working, by Dr. Ing. H. Brown, 390
Locomotive Engineers' Pocket Book, 700
Locomotive Management, Cleaning to Driving, by J. T. Hodgson and J. Williams, 657
Locomotive, Steam, by Prof. J. Jahn, 390

MACHINE Design Construction and Drawing, by Prof. H. J. Spooner, 779
Machine Design, Drawing-Office Problems, by Prof. D. C. Albert, 510
Machine Design, Elements of, by D. S. Kimball and J. H. Barr, 510
Machinery, Overseas Trade in, by W. Thiemann, 594
Machinery, Vibration of, by J. Frith and F. Buckingham, 594
Management, Engineering, by P. F. Walker, 664
Management, Industrial, by R. H. Lansburgh, 619
Manufacturers and Shippers, Kelly's Directory, 95
Marine Engineering Practice, by Engineer-Commander F. J. Drover, 336
Marine Engineering, Steam and other Useful Tables, by P. W. McGuire, 559
Marine Structures, their Deterioration and Preservation, by W. G. Atwood and A. A. Johnson, 589
Masters of Science and Invention, by F. L. Darrow, 390
Materials, Elasticity and Strength, by Professors C. Bach and R. Baumann, 559
Mathematics, Calculus for Home Study, by Prof. C. I. Palmer, 342
Mathematics, Statistical Method in Scientific Investigation, by C. U. Yule, 701. See also 709, 746, 810
Matter and Change, by W. C. D. Whetham, 559
Measuring Appliances and Gauges, Workshop, by L. Burn, 826
Measuring Instruments, Electrical: Part 1, Commercial and Indicating Instruments, by Dr. C. V. Drysdale and A. C. Jolley, 337
Measuring Instruments, Pressure Gauges, Indicators, Thermometers and Pyrometers, by J. Smith, 612
Mechanical Engineers, Institution of, Proceedings, 487
Mechanical Road Transport, by C. G. Conradi, 809
Mechanics, Elasticity and Strength, by Professors C. Bach and R. Baumann, 559
Mechanics, Laws of Impact, by Dr. Ing. F. Berger, 826
Mechanics of Rigid Systems, by Dr. Ing. H. Lorenz, 779
Merchant Navy, Vol. II, by A. Hurd. 672
Merchants, Manufacturers and Shippers, Kelly's Directory, 95
Metallurgy, Alloys and their Industrial Applications, by Prof. O. Bauer, 559
Metallurgy, Cadmium, Properties and Uses, by Dr. N. F. Budgen, 779
Metallurgy, Iron-Carbon System, Theory of, by Dr. E. Heyn, 612
Metallurgy, Ore Dressing, Principles and Practice, by Prof. T. Simons, 619
Metals, Corrosion of, by W. R. Evans, 701
Metals, Institute of, Journal, 278
Mineria, Anuario de, 235
Mining Educator, 694
Mining, Ore Dressing, Principles and Practice, by Prof. T. Simons, 619
Motor Body Work: Design and Construction of Private, Commercial and Passenger Types, by H. J. Butler, 663
Motor-Car, Crossing the Sahara by, by G. M. Haardt and L. Audouin-Dechreuil, 510
Motor-Car, How to Drive, 592
Motor Transport on Roads, by C. G. Conradi, 809
Motors, Electric, Principles and Control, by G. Fox, 556

NATIONAL Physical Laboratory, Gear Measurement, 223; Gauge Testing, 842
Natural Gas, Measurement, Compression and Transmission, by L. C. Lichty, 620
Natural History of Crystals, by Dr. A. E. H. Tutton, 631
Naval, American Submarines, Birth and Development of, by F. T. Cable, 433
Naval and Shipping Annual, Brassey's, 809
Naval Side of British History, by G. Callender, 612
Navy, Merchant, During the War, Vol. II, by A. Hurd, 672
Newcomen Society, Transactions, Vol. III, 672

OIL Engines, by A. L. Bird, 190
Oil Engines, British, by W. A. Tookey, 509
Ore Dressing: Principles and Practice, by Prof. T. Simons, 619
Overseas Trade, Engines and Machinery, by W. Thiemann, 594
Oxy-Acetylene Welders, Handbook for, 33

PAPER Makers, Directory of, 16
Paper-Making Technology, Report, 498
Pattern Making, by J. McC. Wilson, 657
Physical Chemistry, System of: Vol. III, The Quantum Theory, by Dr. W. McC. Lewis, 825
Physics, Kinetic Theory of Gases, by Prof. Bloch, Translated by P. G. Smith, 559
Physics, Matter and Change, by W. C. D. Whetham, 559

Physics, Natural History of Crystals, by Dr. A. E. H. Tutton, 631
Physics, Spectroscopy, by Prof. E. C. C. Baly, 342
Physics, Technical, Manual of, by Prof. G. Gehlhoff, 779
Physics, Theory of Relativity, Bibliography, by M. Lecat, 612
Piles, Timber, Marine Structures, Deterioration and Preservation, by W. G. Atwood and A. A. Johnson, 589
Plates, Flat, Strength of, by C. C. Pounder, 612
Plating, Electro-, and Electroforming (Electrotyping), Principles of, by W. Blum and G. B. Hogaboom, 590
Pocket-Book, Locomotive Engineers', 700
Power, Electric, Supply Costs and Charges, by H. M. Sayers, 779
Power-Factor Booklet, 559
Power Plants, Hydro-Electric, Level Fluctuation in Forebays, by Dr. L. Mühlhofer, 657
Pressure Gauges, Indicators, Thermometers and Pyrometers, by J. Smith, 612
Principes Généraux de l'Etirage et du Tréfilage, by G. Soliman, 673
Producers, Gas, Combustion in, by Dr. A. Korevaar, 826
Pumping, Lowering Ground-Water Level, by Dr. Ing. J. Schultze, 673
Pumping, Modern Theory and Practice, by N. Swindon, 557
Pyrometers, Thermometers, &c., by J. Smith, 612

QUANTUM THEORY, by Dr. W. McC. Lewis, 825

RADIATION and the Quantum Theory, by Dr. W. McC. Lewis, 825
Railroad Engineering, by W. G. Raymond, 238
Railway Officials, Universal Directory, 452
Railway Rolling Stock, Stability of, Influence of Permanent Way, by G. Marié, 238
Railway Signal Engineers, Institution, Proceedings, 542
Railways, Locomotive Management from Cleaning to Driving, by J. T. Hodgson and J. Williams, 657
Rare Elements, Chemistry of, by Prof. B. S. Hopkins, 336
Rayleigh, Lord, Life of, 700
Reinforced Concrete. See *Ferro-Concrete*
Relativity, Bibliography of, by M. Lecat, 612
Research Work, Marine Piling, U.S. Report by W. G. Atwood and A. A. Johnson, 589
Rigid Mechanics, by Dr. Ing. H. Lorenz, 779
Road Engineering, by E. L. Leeming, 524
Road Transport, Mechanical, by C. G. Conradi, 809
Rolling Stock, Railway, Stability of, Influence of Permanent Way, by G. Marié, 238
Rugby Engineering Society, Proceedings, 542

SAHARA, Crossing, by Motor-Car, by G. M. Haardt and L. Audouin-Dechreuil, 510
Saw Mills, by M. P. Bale, 559
Science and Invention, Masters of, by F. L. Darrow, 390
Scientific Investigation, Function of Statistical Method, by C. U. Yule, 701. See also 709, 746, 810
Scientific Work, Sixty-Three Years of, by Sir Francis Fox, 714
Sea Trading, Century of, 500
Sea Water, Deterioration and Preservation of Structures in, by W. G. Atwood and A. A. Johnson, 589
Sell's Buff Book, Telephone Directory, 579
Sell's Directory of Telegraphic Addressess, 451
Shipbuilding Rules and Tables, British Corporation, 738
Shippers, Kelly's Directory of, 95
Shipping Annual, Brassey's, 809
Shipping, Cunard Line, Eight Decades of Progress, 133
Shipping, Law as to C.I.F. Contracts, by H. Goitein, 238
Shipping, Lloyd's Register Book, 166
Shipping, Merchant, During War, Vol. II, by A. Hurd, 672
Soap Making, Theory and Practice of, by Dr. G. Martin, 189
Social Work, Sixty-Three Years of, by Sir Francis Fox, 714
Soudure Electrique à l'Arc Métallique, by S. Frimaudeau, 673
South Africa, Irrigation Engineering, Principles of, by F. E. Kanthack, 631
Spectroscopy, by Prof. E. C. C. Baly, 342
Statistical Method, Function in Scientific Investigation, by C. U. Yule, 701. See also 709, 746, 810
Steam Engines, Calculations and Design, by Prof. R. Grassmann, 509
Steam, High-Pressure, by Dr. F. Münzinger, 238
Steam Tables, Callendar, Enlarged, 612
Steam and other Useful Tables, by P. W. McGuire, 559
Steel, Theory of the Iron-Carbon System, by Dr. E. Heyn, 612
Structural Ironwork, by Prof. M. Foerster, 826
Structures, Marine, their Deterioration and Preservation, by W. G. Atwood and A. A. Johnson, 589
Submarines, American, Birth and Development of, by F. T. Cable, 433
Subsoil Water, Lowering by Pumping, by Dr. Ing. J. Schutze, 673
Surveying, Elementary, by Prof. C. B. Breed and G. L. Hosmer, 433
Swiss Locomotive Construction, 261

TABLES, Steam, Callendar, Enlarged, 612
Tables, Steam and Other, by P. W. McGuire, 559
Technical Costs and Estimates, by A. Miller, 433. See LETTER, 582
Technical Physics, Manual of, by Prof. G. Gehlhoff, 779
Technische Mechanik starrer Gebilde, by Dr. Ing. H. Lorenz, 779
Telegraphic, Addresses, Sell's Directory, 451
Telephone Directory, Sell's Buff Book, 579
Telephones Automatic, by W. Aitken, 663
Telephones, Automatic, by F. A. Ellson, 238
Textile Industry, History of Bleaching, by S. H. Higgins, 701
Theorie der Eisen-Kohlenstoff-Legierungen, by Dr. E. Heyn, 612
Thermodynamics, Callendar Steam Tables, 612
Thermodynamics, Chemical, by Prof. J. R. Partington, 433
Thermodynamics for Engineers, by Prof. Ewing, French Edition, 657
Thermodynamique à l'Usage des Ingénieurs, by M. A. Witz, 657
Thermometers, Pyrometers, &c., by J. Smith, 612
Timber Piles, Marine Structures, Deterioration and Preservation, by W. G. Atwood and A. A. Johnson, 589
Town Planning, Talks on, by H. V. Lanchester, 826
Trade, Overseas, in Engines and Machinery, by W. Thiemann, 594
Traité de Stabilité du Matériel des Chemins de Fer, Influence des Divers Eléments de la Voie, by G. Marié, 238
Transport, Road, Mechanical, by C. G. Conradi, 809

UEBER Diesel-elektrische Locomotiven im Vollbahnbetrieb, by Dr. Ing. H. Brown, 390
Uebersee-Maschinenhandel, by W. Thiemann, 594
Unemployment, Is it Inevitable? An Analysis and a Forecast, 555
Unemployment and Seasonal Operation, Construction Industries, 657
United States, Research Work, Marine Piling, by W. G. Atwood and A. A. Johnson, 589
United States Submarines, Birth and Development, by F. T. Cable, 433
Universal Directory of Railway Officials, 452
Universe, Depths of, by Prof. E. G. Hale, 342

VIBRATION in Engineering, by J. Frith and F. Buckingham, 594
Vorträge aus dem Gebiet der Hydro- und Aerodynamik, 342

WARFARE, Naval Side of British History, by G. Callender, 612
Warships, American Submarines, Birth and Development of, by F. T. Cable, 433
Warships, British, Particulars, 69
Water-Power Plants, Level Fluctuations in Forebays, by Dr. L. Mühlhofer, 657
Water, Subsoil, Lowering Level, by Dr. Ing. J. Schutze, 673
Welding, Arc, Handbook, by C. J. Holslag, 700
Welding, Arc, by S. Frimaudeau, 673
Welding, Oxy-Acetylene, Handbook, 33
Welfare, Industrial, Principles, by J. Lee, 342
West Africa, Coast and Bush Life, by "Coaster," 657
Wire Drawing, General Principles, by G. Soliman, 673
Wood Distillation, by Prof. G. Dupont, 826
Woodworking Machinery, Cosgrove's Handbook, 700
Woodworking Machinery, Saw Mills, by M. P. Bale, 559
Woodworking, Pattern Making, by J. McC. Wilson, 657
Works Management, by R. H. Lansburgh, 610
Works Management, by P. F. Walker, 664
Works Management, Factory Costing, by H. H. Emsley, 673
Works Management, The Modern Foreman, by R. Grimshaw, 390
Works Management, Technical Costs and Estimates, by A. Miller, 433. See LETTER, 582
Workshop Gauges and Measuring Appliances, by L. Burn, 826

YEAR BOOK, Electrical Contractor's, 863

ZEICHNRISCHE Bestimmung der Spiegelbewegungen in Wasserschlössern von Wasserkraftanlagen mit unter Drück durchflossenem Zulaufgerinne, by Dr. L. Mühlhofer, 657

PARAGRAPHS.

Accidents :

Boiler Explosion, Steam Lighter, 863
Factory, &c., Accidents, 103
New York Metal Mines, 840
New York State, Industrial, 778
Swiss Power Plant Accidents, 373

Aeronautics :

Aeroplanes, Light Two-Seater, Trials, *Addendum*, 549
Aeroplane, Military, "Bristol Bloodhound," 114
Aeroplane Performance Estimates, 707
Aircraft, British, Album of, 803
Appointments, Staff, Airship Development, 53
Busk Studentship, 229
Cadetships, Royal Air Force, 415
Engine, Bristol Jupiter Aero, 112
Pageant, Aerial, Royal Air Force, 15
Seaplane, Ambulance, for British Guiana, 593
Steel *v.* Lighter Alloys, 672
Wright Brothers' Medal, 654
Z.R.3 Airship, Transatlantic Journey, 548

Agriculture :

Industry and Trade Committee, 778
Machinery (Catalogues), 754 (2)

Alloys : See *Mining and Metallurgy*

Appointments, Awards, &c. :

Airship Development, Staff Appointments, 53
Bohr, Prof. N., Örsted Medal, 733
Glasgow Technical College, Associate Professorship, 70
Master Cutler, Sheffield, 261
Northampton Polytechnic, Principalship, 132
Ruths, Dr., Industrial Research Medal, 637

Automobiles : See *Motor Cars*

Boilers : See *Engines and Boilers*

Bridges :

Danish Railway and Road Bridge Schemes, 592
London Bridge, Report on, 472
Murray River Bridge Tenders, 199

Bridges—*continued.*

Netherlands Bridge Plan Competition, 198
Railway Bridge, Rapid Construction, 228
Reinforced Concrete Bridge (Catalogue), 660
Thames Bridges, New, 677
Tyne Bridge, New, 372, 801

Buildings and Building Construction :

Architectural Education, International Congress, 167
Brick-Making Machinery (Catalogue), 754
Building Industry Committee (Housing), 558
China Architects' and Builders' Compendium, 372
Girder, Large Building, 306
Standardisation of House Building, Proposed, 176
Steel Houses, Advocacy, 812

Catalogues :

33, 113, 151, 183, 214, 244, 306, 470, 502, 534, 564, 627, 660, 692, 754, 787, 820, 877
A.C.E.C. Company, 244
Aersedcon, Ltd., 692
Amsler, Alfred J., & Co., 534
Anderson-Grice Co., Ltd., 151
Armstrong, Sir W. G., Whitworth & Co., Ltd., 214
Atlas Diesel Engine Co., Ltd., 754
Attwood, J., 692
Automatic and Electric Furnaces, Ltd., 534, 692
B.S.A. Tools, Ltd., 627
Babcock & Wilcox, Ltd., 820, 877
Barimar, Ltd., 692
Beardmore, Wm., & Co., Ltd., 183
Beecroft & Partners, Ltd., 820
Bell's United Asbestos Co., Ltd., 33, 787
Bennis, Ed., & Co., Ltd., 787
Berry, Henry, & Co., Ltd., 504
Blakeborough, J., & Sons, Ltd., 214, 534, 754
Bowran, Robt., & Co., Ltd., 214
British Aluminium Co., Ltd., 306
British Commercial Gas Association, 470
British Electric Transformer Co., Ltd., 470
British Insulated & Helsby Cables, Ltd., 627, 660, 820
British Steel Piling Co., Ltd., 151
British Thomson-Houston Co., Ltd., 470, 502, 534, 564, 627, 660, 754

Catalogues—*continued.*

Brittain's Electric Motor Co., Ltd., 151
Broadbent, Thomas, & Sons, Ltd., 151, 214
Brooke, J. W., & Co., Ltd., 692, 787
Brookhirst Switchgear, Ltd., 692
Brotherhood, Peter, Ltd., 244
Brown, Boveri & Co., Ltd., 183
Brown, David, & Sons (Hudd.), Ltd., 183
Brown Hoisting Machinery Co., 470
Brown & Ward, Ltd., 113
Brush Electrical Engineering Co., Ltd., 151
Butler Machine Tool Co., Ltd., 660
Cambrian Wagon Co., Ltd., 113
Cambridge Instrument Co., Ltd., 151, 244
Campbell & Isherwood, Ltd., 151
Capac Co., Ltd., 470
Cargo Fleet Iron Co., Ltd., 214
Carlaw, David, & Sons, Ltd., 692
Churton, T. Harding & Co., Ltd., 214
Clayton, Goodfellow & Co., Ltd., 754
Cleworth, A. B., & Co., Ltd., 692
Cochrane & Co., Ltd., 214, 660
Codd, E. J., Co., 627
Cole, Marchent & Morley, Ltd., 33
Coles, Henry J., Ltd., 151
Consolidated Pneumatic Tool Co., Ltd., 627
Coventry Chain Co., Ltd., 534, 787
Cox & Danks, Ltd., 692
Crofts (Engineers), Ltd., 660
Crompton & Co., Ltd., 306
Daniell, S. A., Ltd., 151
De Walt Manufacturing Co., 151
Dederich, W., Ltd., 660
Denison, Samuel, & Sons, Ltd., 33
Dobbie, McInnes & Clyde, Ltd., 820
Donovan & Co., 692
Dorman, Long & Co., Ltd., 214
Doulton & Co., Ltd., 502
Edison Swan Electric Co., Ltd., 692
Electric Construction Co., Ltd., 820
Electric Control, Ltd., 33
Ellison, George, 534
Engineering & Lighting Equipment Co., Ltd., 787
English Electric Co., Ltd., 33, 183, 470, 502, 534, 692, 754, 787, 820, 877
Eversheđ & Vignoles, Ltd., 692
Ewart & Son, Ltd., 787
Fahy, F. P., 692
Ferranti, Ltd., 692

Catalogues—*continued.*

Firth, Thomas, & Sons, Ltd., 660
Fluxite, Ltd., 214
Foster Engineering Co., 692, 820
Foster, Joseph, & Sons, 660
Fowler, John, & Co. (Leeds), Ltd., 754
Fraser & Chalmers Engineering Works, 754
Fraser, W. J., & Co., Ltd., 151
Gear Grinding Co., Ltd., 183
General Electric Co., Ltd., 33, 470, 502, 534, 564, 660, 877
Gibson, J. Hamilton 183
Gilman, F. (B. S. T.), Ltd., 183
Graz Railway Carriage, Wagon & Engine Works, 660
Green, E., & Son, Ltd., 502
Hall, B. J., & Co., Ltd., 470
Hattersley (Ormskirk), Ltd., 183
Heap, Joshua, & Co., Ltd., 660
Herbert, Alfred, Ltd., 564
Hoffmann Manufacturing Co., Ltd., 113
Hollings & Guest, Ltd., 692
Holman Brothers, 877
Hopkinson, J., & Co., Ltd., 244
Hotchkiss Hydraulic Propeller Co., Ltd., 151
Howard, James & Frederick, Ltd., 754
Hyatt, Ltd., 33, 244, 534, 627, 692
Johnson & Phillips, Ltd., 33, 113
Jones, A. A., & Shipman, Ltd., 502
Keith, James, & Blackman, Ltd., 183, 214, 534, 627, 787, 820
Lambert Engineering Co., 113
Leeds & Bradford Boiler Co., Ltd., 151
M.O. Valve Co., Ltd., 692
Macnab Stratified Coal, Ltd., 33
Main Ropeways, Ltd., 151
Manlove, Alliott & Co., Ltd., 244, 692, 754
Marshall, Sons & Co., Ltd., 113, 151, 564, 692
Mather & Platt, Ltd., 33, 660, 787, 820
Matthews & Yates, Ltd., 660, 692
Mavor & Coulson, Ltd., 534, 660
Meldrums, Ltd., 470
Melen, F. & H., Ltd., 214
Metropolitan-Vickers Electrical Co., Ltd., 113, 151, 183, 214, 244, 502, 534, 564, 692, 754, 787, 820, 877
Micafil, Ltd., 113
Midgley & Sutcliffe, 787
Mirrlees, Watson & Co., Ltd., 306, 754, 787

Catalogues—*continued.*

Mitchell Conveyor & Transporter Co., Ltd., 564
Morris, Herbert, Ltd., 151
Mumford, A. G., Ltd., 33
National Gas Engine Co., 534, 787
New Switchgear Construction Co., Ltd., 470
Newton, Chambers & Co., Ltd., 306
Niles-Bement-Pond Co., 214
North Eastern Marine Engineering Co., Ltd., 564
Oerlikon, Ateliers de Construction, 660
Oerlikon, Ltd., 183
Oldham & Son, Ltd., 660, 754
Orb Engineering Works, Ltd., 470
Parkinson, F. & A., Ltd., 754
Parsons Motor Co., Ltd., 754
Peebles, Bruce, & Co., Ltd., 214
Pels, Henry, 113, 244
Perkin & Co., Ltd., 113
Petters, Ltd., 502
Philip, George, & Son, Ltd., 33
Pooley, Henry, & Son, 33
Power Plant Co., Ltd., 33
Pratt, F., & Co., Ltd., 214
Price, E. L., Ltd., 660
Purit Specialities, Ltd., 787
Ragosine & Co., 787
Ransome Machinery Co., Ltd., 754
Ransomes & Rapier, Ltd., 660
Renold, Hans, Ltd., 183, 214
Reyrolle, A., & Co., Ltd., 820
Rheostatic Co., Ltd., 33
Robey & Co., Ltd., 787, 820, 877
Ruston & Hornsby, Ltd., 306, 534, 564, 660
S.R.O. Ball Bearing Co., 244
Sankey, Joseph, & Sons, Ltd., 151
Scarr, James, 692
Scott, Ernest, & Co., Ltd., 754
Seagers, Ltd., 787
Sheepbridge Stokes Centrifugal Castings Co., Ltd., 214
Shipley, G. B., 877
Siemens Brothers & Co., Ltd., 151, 306, 502
Simon, Henry, Ltd., 692
Smith, Thomas, & Sons (Rodley), Ltd., 502
South Durham Steel & Iron Co., Ltd., 214
Staveley Coal & Iron Co., Ltd., 470
Steam Fittings Co., Ltd., 151, 244, 820
Steel Nut & Joseph Hampton, Ltd., 113
Sterns, Ltd., 754
Stokoe, C. L., 33
Straits Trading Co., Ltd., 214
Sulzer Brothers, 33, 470, 627, 820
Super-Centrifugal Engineers, Ltd., 692
Swedish General Electric Co., Ltd., 151
Swift, Geo., & Sons, Ltd., 787
Switchgear & Electrical Productions, Ltd., 151
Tangyes, Ltd., 244
Tecalemit, Ltd., 113
Telephone Manufacturing Co., Ltd., 502
Thermit, Ltd., 151, 244
Thornycroft, John I., & Co., Ltd., 787
Trollope & Colls, Ltd., 534, 660
Underfeed Stoker Co., Ltd., 33, 877
Van den Haute, P., 877
Veritys, Ltd., 244, 660, 692
Verzocchi, G., 660
Vickers & International Combustion Engineering, Ltd., 151
Visco Engineering Co., 692
Walker, William, & Sons, Ltd., 820
Watson & Sons, Ltd., 502
Wells, Henry, Oil Co., 627
Western Electric Co., Ltd., 564
Westinghouse Brake & Saxby Signal Co., Ltd., 754
Westinghouse Electric International Co., 33
Westinghouse Electrical and Manufacturing Co., 692, 877
White Patent Oil Burning Co., Ltd., 692
Wicksteed, Charles, & Co., Ltd., 244
Wiggin, Henry, & Co., Ltd., 660
Wilson, Thomas, Son & Co., Ltd., 564
Worthington-Simpson, Ltd., 692
Wright, John & Edwin, Ltd., 151
Yorkshire Copper Works, Ltd., 754
Young, H. G. L., Ltd., 113

Cement and Concrete :

British Empire Cement Manufacture, 381
Piles, Freshly Moulded, Driving of, 739

Chemistry. See *Physics and Chemistry*

Coal :

Anthracite Combine, 199
Ash-Softening Temperatures of Coal, 548
Atritor Pulverisers for Melbourne, 598
Carbonisation, Low Temperature, 334
Cardiff, 15, 53, 95, 133, 167, 199, 229, 261, 291, 329, 372, 415, 453, 487, 519, 549, 583 613, 645, 677, 707, 739, 772, 803, 833, 863
Colliery Requisites, Standard, 815
Cutting Machines (Catalogue), 534, 660
Distribution Costs and Profits, 176
Explosion Hazards, Unwatering of Mines, 839
Explosives, British, Permitted, 583
Explosives in Mining Operations, 291.
Firelighters, Coal Slack, 299
Hull Trade, 95, 414, 548
Lamps, Miners' (Catalogue), 660
Middlesbrough Coke, 15, 53, 95, 133, 167, 199, 229, 261, 291, 329, 373, 415, 453, 487, 519, 549, 583, 613, 645, 676, 707, 738, 771, 802, 833
Milwaukee Power Station, Cost of Coal Handling, 592
Powdered Fuel, 613
Pulverised Coal, Babcock & Wilcox Investigations, 733
Pulverised Fuel, *Erratum*, 91
Pulveriser (Catalogues), 151, 820
Rock Dusting Materials for Mines, 675
Sheffield, 14, 53, 95, 133, 167, 199, 229, 261, 291, 329, 373, 414, 453, 487, 518, 548, 582, 613, 644, 676, 706, 738, 771, 802, 832, 863
South Wales, Board of Trade Return, 95
Spitzbergen Mine Production, 290
Stone Dusting Machine (Catalogue), 754
Stratified Coal Fuel (Catalogue), 33
Welsh Exports and Imports, 833

Colleges. See *Education*

Companies :

General Electric Co., Ltd., 15
Jessop, William, & Sons, Ltd., 291
Spear & Jackson (B.C.), Ltd., 237

Concrete. See *Cement and Concrete*.

Cranes, Conveyors, &c.:

Conveyors, Belt (Catalogue), 470
Conveyors, Newspaper Handling (Catalogue), 692
Cranes (Catalogues), 151 (2)
Cranes, Tenders, 291
Level-Luffing Crane, 25-ton Electric, *Addendum*, 238
Lifting Machinery and Appliances (Catalogues), 151, 660
Mechanical Handling Plant (Catalogue), 564
Ropeways, Aerial (Catalogues), 151, 660
Toplis Patents and Messrs. Stothert & Pitt, 59

Docks. See *Harbours, &c.*

Education:

Accountancy, School of, 372
Aeronautics, Busk Studentship, 229
Bradford Technical College, 291
Bristol University Faculty of Engineering, 228
British Electrical and Allied Manufacturers' Scholarships, 716
Cass, Sir John, Technical Institute, 348
Chelsea Polytechnic, Metallurgical Courses, 415
City and Guilds of London Institute, 261, 515, 840
City of London College Lectures, 167
Crystal Palace School of Engineering, 167
Foundry Workers, Board of Education's Report, 237
Glasgow Technical College, Appeal, 453
Glasgow Technical College, Associate Professorship, 70
Glasgow Technical College, Report, 787
Goldsmid Engineering Scholarships, 265
London University College Centenary, 94
London University College Lectures, 548
London University College Scholarships, 754
London University College Syllabus, 348, 414
Loughborough College Calendar, 451
Morison, D. B., Scholarship, 549
Naval Architects' Scholarships, 592
Northampton Polytechnic Institute, 373
Norton and Gregory Engineering Scholarships, 685
Paper-making Technology, Education in, 498
Ramsay Laboratory, University College, 498
Regent St. Polytechnic, Works Management Lectures, 415
Science Scholarship Examinations, 15
South Wales, &c., School of Mines, 381
Swansea University College, 542
Workers' Education Conference, International, 270
Yorkshire College of Science Jubilee, 780

Electricity:

Aden Electric Supply, 487
Barton Power Station Auxiliaries (Catalogue), 33
Blackbarrow Hydro-Electric Power Scheme, 583
Brakes, Tramway (Catalogue), 754
Cables, Electric (Catalogue), 564
Cable, New York-Azores, High Speed, 461
Cable Steamer Faraday, 863
Chatham Telephone Exchange Contract, 373
Circuit Breakers (Catalogue), 534
Conductors, Copper, British Engineering Standard, 738
Control Apparatus, Camshaft, for Motor Coaches (Catalogue), 33
Control Gear (Catalogue), 564
Controllers, Automatic, for Pumps (Catalogue), 33
Electrical Contractor's Year Book, 863
Electro-Medical Apparatus (Catalogue), 502
Electrode Reaction and Equilibria, 197
Equipment, Electrical (Catalogue), 877
Fans, Electric (Catalogue), 244
Filaments, Very Fine Metallic, 33
Fittings, Electric (Catalogues), 692, 787, 820
Fittings, Light (Catalogues), 660, 787, 820
Furnaces (Catalogue), 534
Fuses, &c (Catalogue), 151
German Industry, Amalgamations in, 304
Gradients, Maximum Potential, Cable, *Erratum*, 198
High-Frequency Measurements, 548
High-Tension Electric Distribution Conference, 236
Hydro-Electric Plant for Mendoza, Tender, 199
Hydro-Electric Plant, Wairere, N.Z., Tenders, 236
Impregnating Plant for Insulation (Catalogue), 754
Instruments, Electrical (Catalogue), 33, 151
Insulating Materials (Catalogue), 113
Italian Telephones, Proposed Sale to Private Firms, 453
Lamps, Electric (Catalogue), 877
Leek Electricity Supply, 549
Lighting, Decorative (Catalogue), 33
Locomotives, Electric (Catalogue), 33
Machinery, Electric General (Catalogues), 151 (2), 183 (3), 306, 502, 660, 820, 877
Mangahao Power Scheme, N.Z., 103
Marine Electrical Machinery (Catalogue), 113
Meters, Electric (Catalogue), 692
Motors, Electric, General (Catalogue), 151, 244 (2), 534, 754, 877
Motors, Rolling Mill (Catalogue), 183
Motor, Small Electric (Catalogues), 244
Motor Starters and Controllers (Catalogues), 502, 660, 692, 754

Electricity—*continued.*

Nash Point Wireless Beacon Station, 582
New Zealand, Water Turbines for, 451
North-West Midlands Electricity District, 833
Oil, Transformer, Shell-Mex Non-Hygroscopic, 352
Ontario, Use of Electricity in, 549
Post Office Tube Railway Contract, 479
Power Plant (Catalogue), 660
Relays, Electrical (Catalogue), 151
Resistance Materials, Standard, 651
Resistances, Electric (Catalogue), 33
Resistances, Low Measurement (Catalogue), 692
Sub-stations, Automatic, 677, 878
Supplies, General (Catalogue), 660
Switchboards (Catalogue), 113, 470
Switches (Catalogue), 820,
Switchgear (Catalogues), 470 (2), 627, 692, 787, 820
Telegraphs and Telephones, Standard Terms, &c., 142
Telegraphy, Submarine, High-Speed, 461
Telephone Apparatus (Catalogues), 534, 564
Telephones, Automatic (Catalogue), 306
Telephone, Marine (Catalogue), 502
Telephone Service, Development, 871
Telephones and Telegraphs, Standard Terms, &c., 142
Thermionic Valves (Catalogue), 692
Transformers (Catalogues), 470, 692, 820
Transformers, Tananaki, N.Z., Tenders, 236
Turbo-Alternator for N.S.W., Tender, 199
Turbo-Generators (Catalogue), 534
Voltmeter, Thermionic (Catalogue), 151
Waikato (N.Z.), Power Scheme, 199
Welding, Electric (Catalogue), 113
Wind-Driven Plant for Lighting (Catalogue), 113
Wireless Beacon Station, Nash Point, 582
Wireless Exhibition, All-British, 183
Wireless Signals and Atmospheric Ionisation, 676
Wireless Tests, Ship's Lifeboat, 566
Wiring (Catalogue), 627
X-Ray Equipment, Portable, 244

Electric Tramways. See *Tramways*

Engines and Boilers:

Boiler Firing (Catalogue), 877
Boiler Mountings (Catalogue), 244
Boilers, Oil Firing (Catalogue), 777
Boiler Plant, Bath, Rapid Installation, 878
Boilers, Waste Heat (Catalogue), 660
Brass Work (Catalogue), 183
Burners, Oil, for Steam Boilers (Catalogue), 692
Clinkers in Boiler Furnaces, Formation, 548
Coal Dust Firing for Boilers (Catalogue), 33
Condensing Plant (Catalogues), 306, 692, 754, 787
Crankshafts, Built-up (Catalogue), 183
Economisers, Fuel (Catalogue), 502
Ejector, Air, Steam-Driven (Catalogue), 151
Engines, Portable (Catalogue), 564, 877
Engines, Steam, Stationary (Catalogue), 692
Feed Water System, Closed (Catalogue), 754
Fittings, Steam (Catalogues), 151, 820
Furnaces, Boiler (Catalogue), 470
Gauges, Pressure (Catalogue), 151
Indicators, Engine (Catalogue), 820
Locomobile Engines (Catalogue), 113
Refuse Destructors, Cascade Grates, 660
Regulators, Automatic (Catalogue), 244
Road Rollers, Steam (Catalogue), 151
Roller, Superheater Steam, 268
Scaling Tool (Catalogue), 183
Steam Plant (Catalogue), 33
Stokers, Mechanical (Catalogue), 787
Stokers, Mechanical, Riley, 462
Superheaters, Locomotive (Catalogue), 564
Testing Instrument, Magnetic (Catalogue), 692
Towers, Water (Catalogue), 534
Turbine for Canada, Tender, 207
Turbines, Marine Geared (Catalogue), 502
Turbines, Steam (Catalogue), 564
Uniflow Engines (Catalogue), 877
Valves (Catalogue), 820

Errata and Addenda :

Aeroplanes, Light Two-Seater, Lympne Trials, 549
Brass Rod, Extrusion of, 415
Crane, Level-Luffing, 25-ton Electric, 238
Dredging and Land Reclamation, 486
Gradients, Maximum Potential, 198
"Lord Combermere" and its Oil Fuel System, 415
Motor, Steam Rail, Sentinel-Cammell, 133
Pulverised Fuel, 91
Salvage of German Ships, Scapa Flow, 373
Self-Unloading Bulk Cargo Vessels, 863
Thomas Gas Meter, 262
Tubular Members, Steel Construction, 716
Vibrac Steel, 423

Exhibitions :

British Industries Fair, Birmingham, 716, 808
Cardiff Exhibit, British Empire Exhibition, 76
Foundry Trades, International, 383
Hydraulic Power, International Exhibition, 864
Lausanne, Colonial and Foreign Products, 799
Lyons Fair, 863
Physical Society, 800
Wireless, All-British, 183

Explosions : See *Accidents*

Explosives : See *Guns*

Ferro-Concrete : See *Cement* and *Concrete*

Fire Prevention : See *Miscellaneous*

Flying Machines : See *Aeronautics*

Gas :

Power Gas, Gas Association Conference, 519
Suction Gas Plant (Catalogue), 787
Textile Industries, Use of Gas, 470
Thomas Gas Meter, *Errata*, 262
Valves and Fittings (Catalogue), 534

Gas and Oil Engines :

Diesel Engine Album, Harland & Wolff, 148
Diesel Engines, Double-Acting, 801
Gas Engines, Thermal Efficiency, 707
Machinery, Internal-Combustion Engine Driven (Catalogue), 754
Marine Oil Engine Trials Committee, 557
Oil Engine Industry, 452
Oil Engines (Catalogues), 33, 244, 306, 470, 502, 534(2), 564, 627, 660, 754(2), 877
Oil Engines' Reliability, 863
Petters' Cold-Starting Oil Engine, S Type, 230
Piston Rings, Narrow-Type Concentric, Standard, 715

Guns and Explosives :

Explosives in Mines, Permitted, 583
Guns (Catalogue), 183

Harbours, Docks, &c. :

Cavalla Harbour Tender Adjudication, 199
Cherbourg as an American Terminus, 770
Danube, Water Leakage, 582
Dredging and Land Reclamation, *Erratum*, 486
Garvel Graving Dock, Greenock, 132
Holyhead Lairage Improvement, 832
Hull Port, History, &c., 6
Waldeck Reservoir Dam, Temperature Fluctuations, 425

Heating : See *Miscellaneous*

Hydraulics :

Air Valve, Water Turbines (Catalogue), 692
Governor, Water-Turbine (Catalogue), 502
Pump, Turbo-Centrifugal, for S. Africa, Tender, 237
Pumps, Centrifugal (Catalogue), 787
Pumps, H.P. Turbine (Catalogue), 787
Pumping Plant, Electrically-Driven, Tender, 244
Pumping Set, Portable (Catalogue), 787
Water Valves (Catalogue), 754

Industries and Commerce :

Australian Trade Statistics, 142, 290
Belgian Customs Tariff, 677
Board of Trade Committee, Industry and Commerce, 176
British Export Trade Figures, 176
Canada and Industrial Research, 94
Canadian Goods and Straw Packing, 738
Canadian Mineral Wealth, 306
China, Export Trade with, 519
Coal Distribution Costs, 176
Engineers, Kelly's Directory of, 582
France, Export Trade with, 520
French Merchandise Marks Regulations, 754
French Tariff, Proposed, on Imported Steel, 237
German Electrical Industry, Amalgamations, 304
Germany and Industrial Capital, 141
Gold Standard, Stability Question, 132
Gutta Percha, Preparation, 676
Hull Council and Foreign Contracts, 237, 328, 452, 558, 621, 685
Indian Trade Statistics, 276
Industrial Output and Trade Union Regulations, 677
Industrial Welfare Society, 133
Industry and Trade, Committee, 716, 778
Iron Trade Prospects, British, 300, 748
Labour Cost, British and Foreign Ports, 195
Locomotives, Egyptian Market for, 270
Manchester Steel Rail Contract for America, 381
Merchants, Manufacturers and Shippers, Kelly's Directory, 95
Nitrogen Products, Synthetic, 372
Oil Engine Industry, 452
Paper Makers' Directory, 16
Petrol Import Growth, 394
Scandinavia, Taxation of Traders, 862
Scandinavian Business Report, 132
Scotch Trade, General, 133
Sells' Buff Book, 579
Sells' Telegraphic Addresses, 451
Sisal Hemp, British Empire Production, 74
Steel Imports in France, Proposed Tariff, 237
Tenders, 168, 176, 179, 199, 236, 237, 244, 262, 291, 373, 415, 542, 622
Textile Industries, Use of Gas in, 470
United States, Exports to, 814
United States Paper Supply, 692
Welfare Society, Industrial Lecture-Conference, 423
Welsh Dock Trade, 833
Works Organisation and Management, 415

Institutions : See *Technical Societies*

Iron and Steel :

Armco Ingots, British Production Arrangements, 451
Automobile Castings, Standard, 176
Automobile Steels, Standard, 181
Bolton Works, Closure of, 300
British Production, 91, 260, 747, 832
Cast-Iron Research Association, 133, 166, 415, 500, 707
Cleveland, 15, 53, 95, 133, 167, 199, 229, 261, 291, 373, 415, 453, 487, 519, 549, 583, 613, 645, 676, 707, 738, 771, 802, 833
Cleveland Blast Furnaces, 329
Corrosion, Report on, 76
Cyfartha Iron Works, Dismantling, 624
East Coast Hematite, 15, 53, 95, 133, 167, 199, 229, 261, 291, 329, 373, 415, 453 487, 519, 549, 583, 613, 645, 676, 707 738, 771, 802, 833
Egypt, Steel Reservoir, Tender, 738
Foundry Iron, Melting, 276

Iron and Steel—*continued.*

French Tariffs on Imported Steel, Proposed, 237
Furnace, Siemens Open-Hearth, Vickers, 166
Heat Treatment (Catalogue), 692
Iron and Steel Institute, Proceedings, 518
Iron Trade Prospects, 300, 748
Ironstone Industry, Conference of Masters and Men, 415
Lectures, City of London College, 167
London Exchange Reports, 415, 516, 878
Middlesbrough Foreign Ore, 15, 53, 95, 133, 167, 199, 229, 261, 291, 329, 373, 415, 453, 487, 519, 549, 583, 613, 645, 676, 707, 738, 802, 833
Osborn's Weatherproof Iron, 14
Piling, Steel (Catalogue), 151
Pipes, Cast-Iron (Catalogue), 470
Pipes, Steel, for South Africa, Tender, 70
Plant, Iron Industry, Need for Better Trade, 621
Pressed Steel (Catalogue), 151
Prices, Iron and Steel, 1924-25, 863
Products, Iron and Steel (Catalogue), 306
Scotch Shipments, 53, 95, 167, 199, 229, 261, 291, 329, 373, 415, 487, 518, 549, 583, 613, 645, 677, 707, 739, 771, 803, 833
Scotch Trade, 14, 53, 95, 133, 167, 199, 229, 261, 291, 329, 373, 415, 453, 487, 518, 549, 583, 613, 645, 677, 707, 739, 771, 803, 833, 863
Sheffield, 14, 53, 95, 133, 167, 199, 229, 261, 291, 329, 373, 414, 453, 487, 518, 548, 582, 613, 644, 676, 706, 738, 771, 802, 832, 863
Sheffield, June Output of Steel, 229
Steel Making, Special Steels (Catalogue), 660
Steel Plate Vessels, &c. (Catalogue), 151
Steelwork (Catalogue), 754
Synthetic Iron Studies, 30
Tees, Imports, 53, 329, 519, 645, 771
Tees Shipments, 15, 199, 329, 519, 645, 771
Titanium, Influence on Iron Castings, 113
Tubes, Wrought-Iron, Chile Market for, 236
Tubular Members, Steel Construction, 716
United States Production, 52
Vibrac Steel, *Errata*, 423
Weatherproof Iron, Osborn's, 14
Welding, Rail (Catalogue), 151
Welsh Trade, 15, 53, 167, 291, 329, 372, 487, 519, 549, 613, 677, 707, 739, 772, 803, 833
Wire, Steel, Drawing of, 630

Labour Questions. See *Trade Societies, &c.*

Lighting. See *Electricity* and *Gas*

Literature. See LITERATURE INDEX

Locomotives. See *Railways*

Machine and other Tools :

Lathes (Catalogue), 787
Machine Tools, General (Catalogues), 113, 502, 627, 660
Milling Machine, Universal (Catalogue), 787
Pneumatic Tools (Catalogue), 627
Sawing Machines (Catalogue), 244
Screwing Machines (Catalogue), 660
Shears (Catalogue), 113, 244
Small Tools (Catalogue), 564
Spanner, Standard, 748
Tools, Hand, &c. (Catalogue), 113, 692
Woodworking Machines (Catalogues), 113, 161

Marine Engineering. See *Engines* and *Boilers, Ships*

Markets :

Cleveland, 15, 53, 95, 133, 167, 199, 229, 261, 291, 329, 373, 415, 453, 487, 519, 549, 583, 613, 645, 676, 707, 738, 771, 802, 833

Mining and Metallurgy :

Alloys, &c. (Catalogue), 660
Aluminium, Properties and Working (Catalogue), 306
Anti-Friction Metal, Eel Brand (Catalogue), 244
Anuario de Mineria, 235
Brass Castings, Special, Standard, 261
Brass Ingots for Castings, Standard, 261
Brass Rod, Extrusion of, *Addendum*, 415
Canadian Cobalt Silver Production, 677
Canadian Mineral Resources, 306, 381
Cobalt, Uses of, 826
Copper, British Standard Specifications, 425, 686
Copper Ores, Leaching, 781
Corrosion, Atmospheric, of Metals, 197
Firebricks (Catalogue), 660
Fluxes and Slags, 622
Foundry Supplies (Catalogue), 820
Foundry Works, Board of Education Report, 237
Furnaces, Electric (Catalogue), 534
Heat Treatment (Catalogue), 692
Metals, Institute of, Journal, 278
Mining Educator, 694
Oil-Drilling Bits, Steel, Investigation of, 501
Pyrometers (Catalogue), 502
Silica Bricks, Transformation under Burning, 708
Silica, Fusing, in Electric Furnace, 848
Silver Solder, Standards A. & B., 261
South Wales, &c., School of Mines, 381
Swansea Metal Exchange Report, 878
Wild-Barfield Furnaces, 396

Miscellaneous :

Air Filters (Catalogue), 692 (2)
Air Washers and Filters, 780
Alcohol, Power, from Sugar Beet, 803
Anti-Vibration Material (Catalogue), 877
Asbestos Goods and Engineers' Supplies (Catalogue), 33
Asbestos Industry (Catalogue), 787
Beet Sugar Factory, Contract, 803
Berlin Street Traffic, 862
Blow Pipes (Catalogue), 183
Bookbinding Machines (Catalogue), 183
Brass Work (Catalogue), 183
Chain Screen, Furnace (Catalogue), 627
Circulating Systems, Safety Devices for (Catalogue), 33

Miscellaneous—*continued.*

Compressors, Air (Catalogue), 820
Contracts, 15, 95, 132, 198, 228, 260, 290, 373, 414, 496, 583, 654, 686, 707, 747, 780, 799, 840, 862
Cowls (Catalogue), 787
Drawing Instruments (Catalogue), 470
Drying Plant, Laundry (Catalogue), 627
Earth-Boring Equipment (Catalogue), 564
Earth-Boring Scheme, Sir Charles Parsons', 548
Electro-Medical Apparatus (Catalogue), 502
Empire Resources, Study of, Shipping Companies' Grant, 650
Empire Works and Treasury Contributions, 394
Enamel, Liquid, for Application Cold, 826
"Engineering News Record," 34
Engineering Standards, British, 142, 175, 176, 181, 261, 425, 583, 651, 686, 738, 748, 771, 815, 878
Engineers, Kelly's Directory of, 582
Engineers and Questions of Public Interest, 350
Fans (Catalogues), 534, 692, 787, 820
Fire Engine Construction, 672
Fire Warnings, 291
Gauge Testing, National Physical Laboratory, 842
Geographical Names, Standardisation of Spelling, 168
Glass Technology Handbook, 327
Glass Technology Society's Proceedings, 518
Granaries (Catalogue), 692
Heating, Hot-Water (Catalogue), 692
Holman Brothers' Works (Catalogue), 877
Indicators, General Engine (Catalogue), 820
Kelvin Centenary Celebrations, 104
Keys and Keyways, Standard, 878
Lantern Slides, Loan for Lectures, 686
Laundry Machinery (Catalogue), 692, 754
League of Nations Hall, Acoustics, 630
Lighting, Decorative (Catalogue), 33
Lubrication (Catalogues), 113, 754, 787
Machinery Noises, Investigation of (Catalogue), 470
Maps (Catalogue), 33
Mathematical Congress, International, 53
Mersey Tunnel Scheme, 461
Metrological Apparatus for Japan, 461
Noises in Machinery, Investigation of (Catalogue), 470
Noises, Street, Minimising, 519
Oils (Catalogues), 627, 754, 787
Paper Makers, Directory of, 16
Paper Making Technology, Education in, 498
Personal, 14, 104, 148, 167, 198, 261, 328, 337, 373, 415, 496, 520, 613, 676, 747, 772, 802, 863
Pipes from Blast Furnace Slag, 600
Pipes, Copper, Heating, &c. (Catalogue), 754
Pottery (Catalogue), 502
Printing Machine (Catalogue), 660
Professional Classes Aid Council, 230
Pulverisers (Catalogue), 151
Pumps, Miscellaneous (Catalogue), 33
Reflectors for Artificial Lighting, 878
Refrigerating Machinery (Catalogues), 244, 470, 787
Refuse Destructors, Cascade Grates for, 660
Road Construction, Bituminous, 862
Road Rollers, Steam (Catalogue), 151
Road Roller, Superheated Steam, 268
Rubber Plantations, Research Work on, 848
Seaweed, Carbonisation of, 172
Sell's Telegraphic Addresses, 451
Separators, Centrifugal (Catalogue), 692
Separators, Oil (Catalogue), 692
Sisal Hemp Decorticating Machinery (Catalogue), 787
Southport, New Arterial Road, 229
Street Noises, Minimising, 519
Sun's Mass, Diminution of, 802
Tenders, 168, 176, 179, 199, 236, 237, 244, 262, 291, 373, 415, 542, 622
Testing Machines, &c. (Catalogue)
Textile Machinery (Catalogues), 660, 820
Thermometers (Catalogue), 244
Timber, Impregnation of, 834
Trade Facilities and Treasury Contributions, 394
Traffic Advisory Committee, 863
Ventilation Scheme, Fanmakers' Prize, 754
Waste Paper Press (Catalogue), 692
Watt's Workshop, Presentation of Contents, 808
Weighbridges (Catalogue), 33
Weighing Machines (Catalogue), 33
Welders', Oxy-Acetylene, Handbook, 33
Welding, Barimar Process (Catalogue), 692
Welding Plant, Oxy-Acetylene (Catalogue), 660
Wire Ropes (Catalogue), 151
Wire-Working Machinery (Catalogue), 470
Wiredrawing, Fine Metallic Filaments, 33
Wood Preservation (Catalogue), 877
Works Organisation and Management, 415
Workshop Notes and Data, 802

Motor Cars, &c. :

Castings, Automobile, Standard, 176
Chains, Motor Cycle (Catalogue), 534
Chains, Roller (Catalogue), 787
Hotel-Location Map, 299
"How to Drive a Car," 592
Karrier Lorry, 372
Lubrication (Catalogue), 113
Petrol Import Growth, 394
Piston Rings, Narrow-Type Concentric, Standard, 175
Piston Ring Pots, Cast Iron, Standard, 583
Pneumatic Tyre Rims, Standard, 261
Rating, Horse-Power, 802
Sahara Motor Service, 864
Shock-Absorber Competition, 592
Steels, Automobile, Standard, 181
Taxation Report, Road Vehicles, 268
Thornycrofts in Canada, 74
Transport Vehicles, Subsidised, 229
Valves for Pneumatic Tyres, Standard, 261
Wheels, Aluminium, for Omnibuses, 168

Naval :

Australian Submarines, 612
British Warship Particulars, 70
Chatham Telephone Exchange Contract, 373
Danish Naval Disarmament, 645
Dutch Cruiser, "Java," 516
French Cruisers, New, 453
French Destroyers, 582, 871
French Flotilla Leaders, 572
French Submarine Construction, 268
Italian Destroyers, 582
Jugo-Slavian Navy, 518
Russian Programme, 462
Salvage of German Ships, Scapa Flow, *Addendum*, 373
Spanish Construction, New, 381, 650
United States Submarine, New, 261

Obituary. See GENERAL INDEX.

Physics and Chemistry :

Air, Rectification of, 843
Alcohol, Dehydration by Glycerin, 344
Chemical Apparatus (Catalogue), 151
Chemical Engineers, Institution Proceedings, 512
Coal, Ash-Softening Temperatures, 548
Coal, Low-Temperature Carbonisation, 334
Cosmic Energy, 834
Gutta Percha, Properties and Preparation, 676
Helium, Compounds of, 832
Ionisation, Atmospheric, and Wireless Signals, 676
Light, Velocity of, 738
Nitrogen Products, Synthetic, 372
Rocks, Igneous, Physical Chemistry, 453
Seaweed, Carbonisation of, 172
Silica for Optical Purposes, Fusing Furnace, 848
Sulphur, Action upon Rubber, 566
Sulphuric Acid Plant, 833
Works, Chemical, Machinery for (Catalogue), 244

Power Plants. See *Electricity*

Power Transmission :

Bearings, Anti-Friction Metal for (Catalogue), 244
Bearings, Ball and Roller (Catalogues), 33, 113, 627, 892
Bearings, Toothed Gear (Catalogue), 244
Belting (Catalogue), 820
Chains, Driving (Catalogue), 183
Clutches (Catalogue), 151
Gears, Fluid Transmission, 842
Gear Measurement, N.P.L., 223
Gears, Reduction (Catalogue), 660
Gear-Tooth Calipers (Catalogue), 183
Gear-Tooth Grinding (Catalogue), 183
Gears, Toothed (Catalogue), 33

Railways and Locomotives :

Australian Transcontinental Railway, 677
Axle-Boxes (Catalogue), 534
Burmah Railway Traffic Returns, 214
Chilian Locomotive Tenders, Result, 237
Cranes, Breakdown (Catalogue), 502
Door Locks, Railway Carriage, Kaye's, 167
Girders, Long, Rail Transport of, 451
Indian Railways, Visit of Sir S. B. Tritton, 564
Kennington, Tube Extension, 328
Locomotives, Diesel-Engined (Catalogue), 660
Locomotives for Egypt, 799
Locomotives for New Zealand, 707
Locomotives, Portuguese Market for, 235
London, M. and S. Railway, New Rolling Stock, 833
Malayan, New Section, 415
Motor, Steam Rail, Sentinel-Cammell. *Errata*, 133
Officials, Railway, Universal Directory, 452
Points, Railway (Catalogue), 754
Rail Welding (Catalogue), 151
Sub-station, Automatic, London Underground Railways, 878
Superheaters, Locomotive (Catalogue), 564
Swiss Locomotive Construction, Winterthur, 261
Wagon, Coal, All-Steel, 299
Wagons, Hopper, 12-Ton, Coke Traffic, 662
Wagons, Railway (Catalogue), 113
Workshop Equipment, Railway (Catalogues), 564, 692

Schools. See *Education*

Sewage and Drainage :

Filtration of Sewage (Catalogue), 692
Leicester Sewage Pumping Station, 871
Romford Riverside Sewage Scheme, 518

Ships and Shipbuilding :

"Antinous," S.S., Trials, 862
British Corporation Rules, &c., 738
Cherbourg as an American Terminus, 770
Clyde Activities, 15, 199, 261, 329, 373, 487, 583, 613, 645, 677, 707, 739, 771, 803
Contracts, 167
Eight Decades of Progress, Cunard Souvenir, 133
Electrical Machinery, Marine (Catalogue), 113
"Faraday," Cable Steamer, 862
Flettner Rotor Ship, 770
Harland and Wolff's Output, 833
Idle Tonnage, Reduction in, 660
Japanese Ships, Loadlines, 113
Life-Boat Conference, International, 207
Lifeboat Wireless Tests, 566
Lloyd's Register, 1924-25, 166
"Lord Combermere" and its Oil Fuel System, *Erratum*, 415
Merchant Shipping Losses, Lloyd's, 166, 519, 820
Motor Boat, Thornycroft, for Holland-America Liner, 676
Motors, Marine (Catalogue), 692
"Moveria," Motor-Vessel, 548
Oil Engine, Marine, Trials Committee, 557
Oil Tanker Contract, Dutch and British Tenders, 422

Ships and Shipbuilding—*continued.*

Propeller, Hydraulic (Catalogue), 151
Propellers, Small Craft (Catalogue), 787
Rotor Ship, Flettner, 770
Sea Trading, A Century of , 500
Scotch Shipbuilding, 15, 199, 261 329, 373, 487, 583, 613, 645, 677, 707, 739, 771, 803
Self-Unloading Bulk Cargo Vessels, 863
"Skegness," S.S., Trials, 833
Sperry Gyro Compass, Applications, 273
"Swanley," M.S., Double-Acting Diesel-engined, 229

Societies. See *Technical, &c.; Trade, &c.*

Strikes. See *Trade Societies, &c.*

Technical Societies :

Acetylene and Welding Association, British, 811
Aeronautical Engineers, Institution of, 230, 423, 672, 707
Aeronautical Society, Royal, 15, 270, 746
Architects, British, Royal Institute, 423
Architectural Education, International Congress, 167
Arts, Royal Society of, 61
Association Technique Maritime et Aéronautique, 803
Automobile Engineers, Institution of, 579, 754, 812
Birmingham Engineers' Club, Proposed, 548
Ceramic Society, Refractory Materials Section, 373
Chemical Engineers, Institution of, 512
Chemical Industry, Society of, 527
Civil Engineers, Institution of, 519
Civil Engineers, Institution of, Ireland, 738
Cost and Works Accountants, Institute of, 103, 168
Electrical Engineers, Institution of, 207, 676
Engineering Inspection, Institution of, 747
Engineers, Australia, Institution of, 112, 204
Engineers (India), Institution of, 112
Engineers and Shipbuilders in Scotland, Institution of, 549, 840
Faraday House Old Students Society, 558
Faraday Society, 133, 197
Ferrantians, Old, 592, 812
Franklin Institute, 53, 738
Gas Association, British Commercial, 519
Gas Engineers, Institution of, 95, 235, 622
Geological Society, 453
Heating and Ventilating Engineers, 780, 863
High-Tension Electric Distribution, International Conference on, 236
Illuminating Engineering Conference, 166
Industrial Welfare Society, 133
International Life-Boat Conference, 207
Iron and Steel Institute, 133
Junior Institution of Engineers, 613, 672, 706, 754, 842, 860
Liverpool Engineering Society, 833
Manchester Association of Engineers, 133
Marine Engineers, Institution of, 583
Mathematical Congress, International, 53
Mechanical Engineers, Institution of, 487, 716
Metals, Institute of, 273
Meteorological Society, Royal, 676
Mining Engineers, Institution of, 415
Mining and Mechanical Engineers, North of England Institute, 207
Motor Manufacturers and Traders, Ltd., Society of, 103
Motor Users' Association, Commercial, 651
Municipal and County Engineers, Institution of, 373, 383, 428, 746
Naval Architects, Institution of, 373, 592, 738
Patentees, Institute of, 801, 878
Petroleum Technologist, Institution of, 745
Photographic Society, Royal, 423
Physical Society, 676
Power Alcohol Association, British, 803
Production Engineers, Institution of, 415
Public Lighting Engineers and Superintendents, Institution of 235, 823
Railway Engineers' Convention, 344
Royal Institution, 651, 724, 814
Rubber, Institute of, 676, 848
Rugby Engineering Society, 542
Sanitary Institute, Royal, 15, 372, 739, 802
Ship Constructors and Shipwrights' Association, 176
Shipbuilding Industry and Wages, 176
Society of Engineers (Inc.), 833, 848
Staffordshire Iron and Steel Institute, 291
Surveyors' Institution, 878
Sweden, Royal Institute of Scientific Industrial Research, 637
Transport, Institute of, 396, 746
University College Engineering Society, 878
Welding Engineers, Institution of, 630
West Yorkshire Metallurgical Society, 262

Telegraphy. See *Electricity*

Telephony. See *Electricity*

Tools. See *Machine and other Tools*

Trade Societies, &c. :

Accident Prevention, Physiological Aspects, 495
Admiralty Dockyard Workers, Wage Increase, 644
Admiralty Workers, Wrabness and Cromble, Award, 300
Apprentices, Metal Worker, and Union Control, 527
Army Ordnance Discharges, Placement of Men, 328
Australian Requisition for Skilled Workers, Cancellation, 328
Baldwin's Workers' Strike, 778
Barking Power Station Dispute, 715, 748
Barrow-in-Furness Plumbers' Wages Claim, 779
Belfast Shipworkers' Wages Question, 300, 527
Belgian Industrial Committee and the Eight-Hour Day, 423, 588
Belgium, Proposed Engineering Lock-Out, 832

Trade Societies, &c.—*continued.*

Bevin, E., on Mutual Understanding in Industry, 495
Blacksmiths and Ironworkers, Associated, Unemployed Members, 869
Blastfurnacemen's Wages, 53
Boilermakers' Claim for Charge Hands and Examiners, 195
Boilermakers' Society, Contribution Changes, 270
Boilermakers' Society, Reports, 270, 423, 558, 840
Boilermakers' Society, Unemployed Members, 716, 840
Boilermakers' Wage Claim, 812, 839
Bricklayers, Mr. Hicks' Vindication, 748
Bristol Channel A.E.U. Ship Repairers' Strike, 300, 591
Bristol Colliery Owners' Benefit Case, 452
Building Dispute, Weather Losses Question, 176
Building Industries Committee, Composition, 558
Building Industries Committee's Proposals, 685
Building Trade Dispute, Court of Inquiry, 24, 61, 106, 176, 195, 237, 300
Building Trade, Liverpool Strike, 24, 61, 106, 195, 237, 300
Building Trade Operatives' Dispute, 24, 61, 106, 176, 195, 237, 300
Building Trade Operatives and Steel Houses, 869
Building Trade, Scottish Wages Committee and Working Hours, 452
Building Trades and Summer Working Hours, 423, 452
Building Trade Wages and Conditions Council, 495
Canadian Metal Working Industry, Unemployment, 558
Capitalism, A.E.U. Member's Views, 621
China, Working Hours in, 300
Chinese Soldiers, Teaching Industrial Pursuits, 869
Class War, Depreciation by A.E.U. Member, 621
Cleveland Miners' Wages, 549
Communism and the Trade Unions, 527, 685
Communist, British, on Strike Methods, 748
Co-operative Society Employees, Compulsory Membership of Unions, 557
Coopers, Society of, and Use of White Lead, 300
Cost of Living and Extravagant Wages, 685
Cotton Spinners, Working Hours, 495, 591
Court of Reference, Suggested, 495
Covent Garden Porters' Strike, 300, 422
Cumberland Colliery Stoppages, 495
Darlington Railwaymen and Clocking off Question, 270
Disputes, Conference on Avoidance Scheme, Suggested, 527
Dole and Unemployment, 327
Dutch Labour Conditions and Rates of Pay, 452
Druce & Co., Trading and Wages Award, 380
Eight-Hour Day and Belgian Industrial Committee, 423, 588
Eight-Hour Day and German Factory Workers, 558
Eight-Hour Day, International, Conference on, 381, 558
Eight-Hour Day and International Metalworkers, 270
Eight-Hour Day and International Textile Workers, 328
Eight-Hour Day and Overtime, 176
Electric Power Industry, Incidence of Wage Increases, 591
Electrical Trades Dispute, 141, 195, 237, 270, 299, 381, 423, 591, 716
Electrical Trades Dispute, Proceedings of Special Tribunal, 423, 591, 716
Electrical Trades Special Tribunal, Report, 591
Electrical Trade Unions and the Barking Dispute, 715, 748
Electrical Workers' Dispute, Kensington and Brompton, 869
Emigration of British Skilled Mechanics, 141
Employers, Confederation of, and Mr. Pollitt, 621
Employers and Employed, Suggested Conference on Truce, 527
Employment Exchange Statistics, 591
Engineering Industry, Disputes, Procedure for Avoiding, 527
Engineering Journeymen, Wages Agreement, 558
Engineering Trades, Wages Demand, 61, 103, 141, 237, 270, 558, 779, 840
Engineering Trade Wages, Work of Sub-Committee, 558
Engineering Union, Amalgamated, Consolidation Question, 270
Engineering Union, Amalgamated, and Ex-Members, 423
Engineering Union, Amalgamated, Kirkcaldy Wages Error Case, 591
Engineering Union, Amalgamated, and Labour Colleges, 591
Engineering Union, Amalgamated, Membership, 716, 846
Engineering Union, Amalgamated, and the Minority Movement, 748

Trade Societies, &c.—*continued.*

Engineering Union, Amalgamated, Reports, 270, 381, 558
Factory Bill and Welfare Work, 423
Factory Committees, "Red" Scheme, 591
Factories and Workshops Report, 103
Foreign Rates of Pay, &c., and British Labour, 452
Foremen and Membership of Unions, C.W.S., 558
Foundry Workers, Board of Education Report, 237
French Seamen's Eight-Hour Day, 644
General Federation and Industrial Courts Act, 237
General Federation of Trade Unions, 61, 300, 748
General and Municipal Workers, National Union, 381
German Factory Workers' Union and Eight Hours' Day, 558
German Miners and Seven-Hour Day, 685, 779
Germany and the Eight-Hour Day Ratification, 839
Glasgow Corporation and U.S. Track Work Tender, 715
Gompers, Samuel, the Late, 840
Holland, Rates of Pay and Conditions, 452
Hours of Labour, Continental Conditions, 495
Housing Committee, Composition, 558
Housing Committee, Materials and Methods, 380
Housing Committee's Report, 327
Hull Labour Council and a German Tender, 237, 328, 452, 558, 621, 685
Industrial Courts Act and General Federation, 237
Industrial Notes, 24, 61, 103, 141, 176, 195, 237, 270, 299, 327, 380, 422, 452, 485, 527, 557, 591, 621, 643, 685, 715, 748, 778, 811, 839, 869
Industrial Situation, Reports, 195, 300, 423, 591, 716, 840
Industrial Truce, Suggested Conference on, 527
Industrial Truce, Suggested Court of Reference, 495
Industrial Welfare Society's Annual Meeting, 685
Industrial Workers' Charter and Trade Union Congress, 328, 380
Industry and Trade Committee, Evidence, 716, 778
Invernairn, Lord, on Industrial Welfare, 685
Iron Trade Plant and Production per Man, 621
Iron Trade Workers, Low-Paid, Special Bonus, 270
Ironstone Industry, Conference of Masters and Men, 415
Ironworkers' Wages, 167, 270, 739
Ironworks Strikers, Claim for Dole, 261
Journeymen, Engineering Wages Agreement, 558
Kent Miners' Dispute, Award, 527
Kirkcaldy, Wages Error Case, 591
Labour, British, Influence of Foreign Rates of Pay, &c., 452
Labour Colleges and the A.E.U., 591
Labour Cost at British and Foreign Ports, 195
Labour Exchanges, Russian, 748
Labour Ministry Reports, 195, 300, 381, 423, 452, 495, 527, 558, 591, 621, 644, 685, 716, 748, 778, 812, 840
Labour Notes. See *Industrial Notes* (above)
Lambourne's Employees, Travelling Expenses Case, 381
Light Castings Ironfounders, Wages Demand, 24, 685
Living, Cost of, Reports, 195, 591, 716
Locomotive Drivers, Non-Qualified and the N.U.R., 328
Locomotive Engineers, &c., and Mileage Payment, 715, 778, 869
Locomotive Engineers, &c., Women's Society, Proposed, 328
London County Council Employees, Wages Award, 527
Machinists, International Association, Strike Benefits, 621
Managers and Membership of Unions, C.W.S., 558
Manchester Tramways Committee and Rail Contract, 381
Mechanics, British Skilled, Emigration of, 141
Metal Industries, Russian, Development Question, 748
Metal Workers, &c., Emigration of, 328
Metalworkers' Federation and the Eight-Hour Day, 270
Metalworkers' Federation, International Contribution Scheme, 270
Metalworkers' Federation and the Russians, 270, 812
Metal Workers' Programme, 495, 527
Metal-Working Industry, Canada and U.S., Unemployment, 558
Metropolitan Water Board, Charge Hands' Wages, 495
Miners' Congress, International, and War, 237
Miners' Federation Conference, Policy, 61, 103

Trade Societies, &c.—*continued.*

Miners' Federation and Holidays, Wages, &c., 103
Miners' Federation, Position, 685
Miners' Federation and the Workmen's Compensation Act, 103
Miners' International Committee's Proposals, 685
Miners' Political Influence, 176
Miners' Wages, Eastern Area, 24
Mines, Nationalisation of, 103
Minority Conference, National, Demands, 299
Moscow Labour Exchange Register, 527
Moscow Textile Workers and Unskilled Union Members, 644
Moscow Trade Union Developments, 716
Municipal Wages, High, Effect on Unsheltered Trades, 452
National Minority Conference and Trades Union Congress, 299, 328
National Minority Movement, 591, 621, 644, 778
New York State, Industrial Accidents, 778
New York State Labour Department Conference, 748
Non-Unionists, Coercion by Unions, 422
Nottingham, Celebration of Unions' Fusion, 24
Patternmakers' Association, United, and Industry and Trade Committee, 716
Patternmakers' Association, United, Reports, 237, 558, 869
Patternmakers' Association, United, Unemployed Members, 716, 869
Pollitt, H., and Confederation of Employers, 621
Port Employers and Transport Workers, Alleged Breach of Agreement, 328
Preston, Engineering Workers' Dispute, 748
Production Sub-Committees, Russian Trade Unions, 644
Psychologist, Industrial, and Welfare Work, 495
Railways, Nationalisation of, 103
Railway Shopmen's Demand and the Companies, 237
Railway Wages Board, 495
Railwaymen's Conference and Sectional Union Question, 61
Railwaymen and the 44-Hour Week, 380
Railwaymen, Mr. Marchbanks on New Movement, 452
Railwaymen, National Union of, 61, 103
Railwaymen's New Programme, Details, 812
Railwaymen's Wages, Proposed New Programme, 103, 527, 812, 840
Railwaymen and the Washington Hours Convention, 103
"Red" Russo-British Organisation, Proposed, 778, 812
Road Transport Workers' Demands, 24, 423
Rotherham Strikers and Unemployment Benefit, 300
Ruhr Miners and 8-Hour Day Agreement, 779
Russian Building Trade Wages, 558
Russian Labour Exchanges, 748
Russian Labour Situation, 300
Russian Metal Industries, Development Question, 748
Russian Metalworkers, Affiliation Question, 270
Russian Productivity and Wages, 621, 685, 869
Russian State Industry and Wages, 621, 685
Russian State-owned Undertakings, Production Sub-Committee, 643
Russian Textile Workers' Congress, Report, 811
Russian Trade Disputes and Arbitration, 778
Russian Trade Unions' Central Council, Income, 527
Russian Trade Unions Congress, 778
Russian Unemployed, Investigation, 527
Russian Union Labour Commissariat and the Indigent, 381
Russian Workers, Piece-work Scheme, 685
Russian Working Days, 495
Seamen's 8-Hour Day, French Decree, 644
Seamen's Working Day, International Conference, 381
Sheffield District Benefit Case, Finding, 452
Sheffield Steelworkers' Strike, 270, 558
Shipbuilding Employers' Federation and Boilermakers' Demand, 839
Shipbuilding Employers' Federation, Central Board Appointments, 558
Shipbuilding Trade, Conference on Working Conditions, 380
Shipbuilding and Vexatious Regulations of Unions, 141
Shipping Trade and Union Regulations, Handicapping of Tenders, 422
Shop Committees, Russian, and Production Sub-Committees, 643
South Wales Miners' Federation and Alliance with Productive Workers, 24
South Wales Miners' Secretary, Defeat of Censure, 24
Soviet Organisation of Labour for Production, 644
Steel, Peech & Tozer's Employees, Wages Dispute, 237
Strike Benefits, International Association of Machinists, 621

Trade Societies, &c.—*continued.*

Strikes, Methodical, a Communist's Views, 748
Strikes, Right of Unions, 495
Strikes, Sectional, in Steel Trade, Effect of, 452
Strike Statistics, Reports, 195, 840
Swales, A. B., Achievement, 495
Sympathetic Strikes and Industrial Agreements, 422
Textile Workers, International, and the 8-Hour Day, 328
Textile Workers, International, and the Russians, 328
Textile Workers' Wages Question, 328
Toronto Unemployment Conference and Doles, 381
Trade Disputes and Powers of Trades Union Council, 299, 380
Trades Union Congress, 299, 327
Trades Union Congress and National Minority Conference, 299, 328
Trades Union Congress, Visit to Russia, 644, 869
Trades Union General Council and Policy Scheme, 811, 840
Trade Union Regulations and Industrial Output, 677
Trade Union Statistics, 644
Trading Results and Wages Case, Award, 380
Tramway Workers' Wages Question, 195, 495, 644, 716
Transport and Cartage Workers, Wages, Hours, &c., 24, 423
Travelling Expenses, Lambourne and Co.'s Employees, 381
Tyneside Engineers on Diesel Engines, Rates of Pay, &c., 423
Unemployed, Russian, Investigation, 527
Unemployment and the Dole, 327
Unemployment Insurance Benefit Cases Findings, 452
Unemployment, Labour Ministry Reports, 195, 300, 381, 423, 452, 495, 527, 558, 591, 621, 644, 685, 716, 748, 778, 812, 840
Unemployment Pay, Strikers' Claim, 261
Unionism and the Communists, 685
Unions, Coercion of Non-Unionists by, 422
Unions, Trade, Friendly Society Statistics, 644, 779
United States Bill, Wages and Production, 621
United States Metal Working Industry, Unemployment, 558
Vienna Metalworkers' Strike, 423
Wages, Extravagant, and Cost of Living, 685
Wages, Fluctuation of, Reports, 195
Wages and the Minority Conference, 299
Wages Policy and the General Council of Congress, 300
Wages and Production, United States Bill, 621
Wages Reference, L.C.C. Employees' Award, 527
Welfare Society, Industrial, Lecture Conference, 422
Welfare Work and the Factory Bill, 423
Welfare Workers, Industrial, Conference, 495
Welfare Workers and Shorter Working Day, 495
Woodworkers, Amalgamated Society of, 869
Woolwich Arsenal, Semi-skilled Employees and Wages, 24
Workers' Education Conference, International, 270
"Worker," National Minority Movement Propaganda, 778
Workers' Union Men's Strike at Baldwin's, 778
Working Days, Russian, 495
Working Hours in China, 300
Working Hours and the Minority Conference, 299
Working Week and Foreign Competition, 452
Working Week and Ratification of Washington Convention, 812
York, Duke of, on Industrial Welfare, 685

Trade. See *Coal; Iron and Steel; Ships and Shipbuilding; Electricity;* and *Industries*

Tramways :

Brakes (Catalogue), 754
Glasgow Corporation, 167
Glasgow Corporation and U.S. Trackwork Tender, 716
Liverpool Corporation, 53
Traffic Receipts, U.K., 245
Tramway Undertaking Receipts, Reduced, 207

Turbines. See *Engines and Boilers*

Universities. See *Education*

Vehicles. See *Motor Cars; Railways*

Warships. See *Naval*

Waterworks, &c. :

Filters, Vaal River Scheme, Tenders, 264
Leicester Waterworks, 871
Well Sinking (Catalogue), 820
West Dean Supply Scheme, 542

PATENT RECORD.

The Patent Index is classified under the following sub-titles:—AERONAUTICS; AGRICULTURAL APPLIANCES; ELECTRICAL APPARATUS; GAS ENGINES, PRODUCERS, HOLDERS, &c.; GUNS AND EXPLOSIVES; HYDRAULIC MACHINERY; LIFTING AND HAULING APPLIANCES; MACHINE AND OTHER TOOLS, SHAFTING, &c.; MINING, METALLURGY AND METAL WORKING; MISCELLANEOUS; MOTOR ROAD VEHICLES; PRINTING AND ALLIED MACHINERY; PUMPS; RAILWAYS AND TRAMWAYS; SHIPS AND NAUTICAL APPLIANCES; STEAM ENGINES, BOILERS, EVAPORATORS, &c.; AND TEXTILE MACHINERY.

SUBJECT MATTER.

Aeronautics :

307, 661
Metallic Aircraft Construction. Armstrong. Siddeley Motors, Ltd., and H. N. Wylie, 307
Rudders of Aeroplanes. The Fairey Aviation Co., Ltd., and F. R. Fairey, 661
Shock-Absorbers. The Fairey Aviation Co., Ltd., and C. R. Fairey, 307

Agricultural Appliances :

879
Disc Cultivators or Harrows. H. McLaren, 879

Electrical Apparatus :

34, 395, 504, 567, 661, 693, 755, 879
Commutators. J. E. Calverley and W. E. Highfield, 504
Dynamo Electric Machines. The British Electric Plant Co., Ltd., and A. W. Maudling, 879
Insulators. R. J. P. Briggs, H. S. Newman and Bullers, Ltd., 395
Meters, Electricity, W. M. Mordey and the Electrical Apparatus Co., Ltd., 693
Motors, Electric. H. V. Higgitt and the Eastern Telegraph Co., Ltd., 879
Motors and Pumps, Combined Electric. T. L. R. Cooper, 661
Motor Starters and Controllers, Automatically-Operated Electric. Brookhirst Switchgear, Ltd., and A. C. Livesey, 34
Protective Arrangements for Electric Distribution Systems: Switchgear & Cowans, Ltd., and G. H. Neep, 755
Switches, Electric. The Cable Accessories Co., Ltd., and A. Crawford, 879
Switches, Electric. A. C. Smith, 567
Transformers. A. H. S. MacCallum, 504
Welding Apparatus, Electric, C. A. Hadley and the Rose Street Foundry and Engineering Company, Ltd., 755

Gas Engines, Producers, Holders, &c.:

152, 184, 307, 395, 471, 661, 693, 755, 788, 849, 879
Air Brake Dynamometer Engine Power-Testing Mechanism. Armstrong-Siddeley Motors, Ltd., F. R. Smith and B. W. Shilson, 755
Bearings, Lubrication of. D. Napier & Sons, Ltd., and G. S. Wilkinson, 755
Burners, Oil Fuel. Sir W. G. Armstrong, Whitworth & Co., Ltd., and B. Irving, 693
Carburetting Apparatus. J. Thomas and W. Harding, 849
Carburettors. Brown and Barlow, Ltd., and C. Brown, 395
Coal Gas, Apparatus for Manufacturing. J. T. Ashley and Aldridge & Ranken, Ltd., 693
Cylinders. Swan, Hunter & Wigham Richardson, Ltd., F. Rowntree and P. Belyanin, 307
Cylinders, Internal-Combustion Engine. S. Smith and A. C. Cars, Ltd., 693
Cylinders, Internal-Combustion Engine. Wallsend Slipway & Engineering Co., Ltd., and J. S. Simm, 471
Internal-Combustion Engines. William Beardmore, Lord Invernairn and A. E. L. Chorlton, 788, 879
Internal-Combustion Engines. J. Davidson, 184
Internal-Combustion Engines. A. H. Moss, 849
Internal-Combustion Engines. Palmers' Shipbuilding and Iron Co., Ltd., and D. Kemp, 755
Internal-Combustion Engines, Sleeve-Valve. W. Newbery, 395
Lubricating Systems. Force Feed. S. H. Attwood and Ruston & Hornsby, Ltd., 395
Pistons. Swan, Hunter & Wigham Richardson, Ltd., and P. Belyanin, 395
Pistons and Piston Rods. Wallsend Slipway and Engineering Co., Ltd., and J. S. Simm, 661
Radiator Controllers, Shutter. C. A. Brown, 152
Retorts, Apparatus for Removing Coke from, Ride & Bell, Ltd., and G. Bell, 849
Sparking Plugs. F. Reynolds and the Thermal Syndicate, Ltd., 395

Guns and Explosives :

34, 246
Bomb Release Mechanism. H. W. Holland and W. Mansfield, 34
Sighting Devices for Director Firing. Sir W. G. Armstrong, Whitworth and Co., Ltd., and R. Morrison, 246

Hydraulic Machinery :

395, 471, 693, 788
Flow of Liquids through Pipes, Indicating Apparatus. Pulsometer Engineering Co., Ltd., and J. Björnstad, 693
Pipe Joints, Loose-Flange. C. Williams, W. G. Bellamy and the British Mannesmann Tube Co., Ltd., 471
Sluice Gates. Ransomes and Rapier, Ltd., and P. D. Ionides, 788
Water Meters. W. G. Kent, 395

Lifting and Hauling Appliances :

34, 246, 567, 755, 788, 849, 879
Brakes, Friction. M. B. Wild & Co., Ltd., and M. B. Wild, 755
Chains and Belts. Camp & Co., Ltd., A. H. F. Perl and R. H. Carter, 34
Conveyors, Reciprocating, Operating. Norton's (Tividale), Ltd., and H. Aughtie, 567
Cranes, Jib. E. Graham and W. Chipperfield, 880
Cranes, Jib. Thomas Smith & Sons (Rodley), Ltd., and F. Fawcitt, 849
Cranes, Jib. Stothert & Pitt, Ltd., C. M. Toplis and W. W. Padfield, 567
Cranes, Jib. H. G. Taylor and A. P. Smith, 788
Conveyors, Gravity Bucket, H. J. Toogood and Robert Dempster & Sons, Ltd., 246
Excavators Drag Line. Lobnitz & Co., Ltd., and H. O. Bedgood, 879
Hoisting Devices. J. Hughes and D. L. Thomas, 849
Lifting Hooks. H. Morris and J. A. Butterworth, 788

Machine and other Tools, Shafting, &c.:

152, 246, 307, 396, 471, 755, 788, 880
Boring and Turning Mills. C. D. Andrew and Sir W. G. Armstrong, Whitworth & Co., Ltd., 246
Clutches, Centrifugal Friction. Thos. Broadbent & Sons, Ltd., and A. H. Weir, 755
Gear-Cutting Machines. David Brown & Sons (Huddersfield), Ltd., A Sykes and H. E. Kitchen, 880
Gears, Speed Reducing. L. Burn, 788
Lathes. H. R. and J. W. Milnes, 396
Percussion Tools. G. H. Thompson, 152
Presses, Notching and Punching. A. E. Cooper and C. Jones, 152
Presses, Power Screw. Daniel Smith, Ltd., and D. Smith, 788
Tube-Expanding Tools. J. A. Metcalf and A. Lennox, 471
Turning-Lathes. F. R. Wade and C. A. V. Small Tools, Ltd., 307
Vertical Heading or Forging Machines. Guest, Keen & Nettlefolds, Ltd., and E. Crosse, 396

Mining, Metallurgy and Metal Working :

246, 504, 567, 661, 693, 755, 788, 849
Coal-Cutters. Sir W. G. Armstrong, Whitworth & Co., Ltd., R. W. Wilson and R. F. H. Hedley, 567
Coal-Cutting Machines. Cannock Chase Colliery Co., Ltd., and J. H. Poynton, 788
Coal-Cutting Machines. J. Lithgoe and J. Linneker, 849
Coal-Cutting Machines. W. A. Logan. 504
Coal, Screening and Washing. Head, Wrightson & Co., Ltd., R. S. Benson and H. Clark, 693
Cutting Metal. M. McC. Bidder, 849
Drying Cylinders, Rotary. Fisher, Humphries & Co., Ltd., and H. M. Hutchinson, 756
Foundry Moulding Machine. J. Cash, 661
Furnaces. Travers & Clark, Ltd., M. W. Travers and F. W. Clark, 504
Furnaces, Oil Fuel. W. M. and M. M. Burdon, and Burdons, Ltd., 693
Hammers, Fluid Pressure. Davy Brothers, Ltd., and T. W. Hand, 756
Joints, Welded. J. S. and W. E. Highfield, 661
Lock Forming Sheet Metal, Apparatus for. J. A. Duxbury and W. P. Butterfield, Ltd., 755

Mining, &c.—*continued.*

Moulds, Ingot, G. W. and J. F. Naylor, 693
Sheets, Flattening, Stretching and Straightening. W. Jones, 246
Vapours, Hydro-Carbon Oil, Treatment of. F. Lamplough, 661

Miscellaneous :

34, 152, 308, 396, 662, 694
Bolts, Securing of. H. G. Hawker Engineering Co., Ltd., and B. Thomson, 34
Chambers, Heat-Insulated. R. L. Owens, 308
Road Scarifiers. John Fowler & Co. (Leeds), Ltd., and D. Wood, 662
Road Surfaces, Spraying Apparatus for Treating. W. Glossop, 152
Spraying Devices. Babcock & Wilcox, Ltd., and S. F. Weston, 396
Taps and Cocks. N. W. Bancroft, 694
Temperature Control Apparatus, Automatic. James Keith & Blackman Co., Ltd., and G. Keith, 396

Motor Road Vehicles :

34, 152, 184, 307, 396, 504, 694, 756, 850
Brakes. Bentley Motors, Ltd., and F. T. Burgess, 184
Brakes. Sunbeam Motor Car Co., Ltd., and L. Coatalen, 34
Endless Track Vehicles. Roadless Traction, Ltd., and O. S. Penn, 184
Engine Crankshaft and Differential Driving Gearing, Combined. S. E. Alley and G. Woodvine, 504
Furnace, Oil-Fuel, Motor Wagon. Deighton's Patent Flue and Tube Co., Ltd., C. A. Millington and W. J. Lewin, 184
Gear-Operating Mechanism, Change-Speed. S. L. Bailey, 307
Motor-Wagon Gulley Emptying and Recharging Apparatus. W. J. Lewin and Deighton's Patent Flue and Tube Co., Ltd., 756
Road Rollers. A. Wallis, 396
Springing of Vehicles. G. Barker, 396
Steering and Controlling Road Vehicles, Associated Equipment Co., Ltd., and H. K. Thomas, 504
Tractors. Armstrong Siddeley Motors, Ltd., and H. M. Bonhaud, 694
Tyres, India Rubber, Making. J. Kearns and W. Y. Duncan, Jnr., 756
Vehicles Having Self-Laying Tracks. Armstrong Siddeley Motors, Ltd., and H. M. Bonhaud, 756
Vehicles, Motor Road. Walker Brothers (Wigan), Ltd., and W. D. Williamson, 307.
Vehicles, Six-Wheel Road. E. R. Foden & Fodens, Ltd., 850
Vehicles, Transport. C. K. Edwards and The Associated Equipment Co., Ltd., 152
Windows, Sliding. R. E. Tompkins, 850

Printing and Allied Machinery :

567, 661
Folding Mechanism. H. G. Rogers, 661
Printing Machinery. H. G. Rogers, 567

Pumps :

184, 307, 567, 850
Fire Engine Pumps, John Morris & Sons, Ltd., and J. and F. Morris, 850
Pumps. L. Ward, 307
Raising of Liquids. K. A. B. Gilfillan, 184
Straining or Filtering Apparatus. F. C. Fulcher, 567
Valves, Automatic. Swan, Hunter & Wigham Richardson, Ltd., F. Rowntree and P. Belyanin, 850

Railways and Tramways :

34, 568, 661, 850
Brake Gear. Cammell Laird & Co., Ltd., and A. S. Bailey, 568
Couplings, Automatic. H. W. S. Husbands, 850
Door Locking Apparatus. F. S. Roberts and W. H. Evans, 661
Rails, Securing in their Chairs. R. J. M. Inglis, 34
Railways, Electric. Sir P. Dawson and F. W. Fawdry, 568
Staircases for Passenger Vehicles. E. G. Walker and the Metropolitan Electric Tramways, Ltd., 662
Vehicles, Metal Railway. Cammell Laird & Co., Ltd., and A. S. Bailey, 34

Railways and Tramways—*continued.*

Vehicles for Use on Rail Traction Systems English Electric Company, Ltd., and C. E. Fairburn, 850
Wheels and Axles. Cammell Laird & Co., Ltd., and A. S. Bailey, 568

Ships and Nautical Appliances:

152, 184, 308
Barges. Flannery, Baggallay & Johnson, Ltd., A. Harker and the Hon. A. McDonnell, 184
Bulkhead Doors, Operating. R. A. Blakeborough and G. H. Reed, 152
Screw-propelled Navigable Vessels. John I. Thornycroft & Co., Ltd., and Sir J. I. Thornycroft, 308

Steam Engines, Boilers, &c.:

246, 308, 471, 504, 568, 662, 694, 756, 850, 880
Bearings, Thrust, for Marine Engines. W. Whelan, 471
Boiler Feed Water Supply Plants. H. Fothergill, 662
Boilers, Steam. Aveling and Porter, Ltd., and T. L. Aveling, 756
Boilers, Steam. N. E. McClelland, 880
Boilers, Steam. E. Watson, 756
Boilers, Steam, Gas-Fired. R. L. Roxburgh, 662
Boilers, Vertical Steam. S. E. Alley and A. C. Hutt, 472
Boilers, Water Tube. W. Y. Lewis and A. A. Cawkwell, 308
Boilers, Water Tube. Stirling Boiler Co., Ltd., and E. E. Noble, 472, 568
Burners, Liquid Fuel. Henry Wilson & Co., Ltd., and H. Foden, 850
Condensers, Steam. G. & J. Weir, Ltd., and J. G. Weir, 504, 694
Condenser, Surface, Installation. Mirrlees Watson Co., Ltd., and W. A. Dexter, 472
Engines, Steam. H. B. Watson and T. C. Billetop, 471
Fire-Bars, Furnace. A. T. Patterson, 568
Fuel Feed Devices, Mechanical. J. Fallon, 308
Furnaces. J. S. Atkinson and Stein & Atkinson, Ltd., 694
Furnaces. London Electric Supply Corporation, Ltd., and A. G. Fox, 471
Gauges, Pressure. C. W. Bryant and Peter Brotherhood, Ltd., 694
Generators, Steam. London Electric Supply Corporation, Ltd., and A. G. Fox, 568
Generators, Steam. Stirling Boiler Co., Ltd., and H. J. S. Mackay, 472
Generators, Water-Tube Steam. A. Elliott, 662, 694
Grates, Furnace. A. W. Bennis, 880
Packing. Sir A. S. Haslam, 471
Power Plants, Steam. H. Fothergill, 308
Re-heaters, Steam, H. E. Yarrow, 246
Valve, Mixing. C. M. Hadwen and Ferguson Superheaters, Ltd., 880

Textile Machinery:

308, 472
Combing Machines. John Hetherington & Sons, Ltd., and C. W. Cooper, 472
Spinning Frame Mechanism. David Keay & Leslie, Ltd., and J. Ness, 308
Thread-Testing Machines. British Cotton Industry Research Association and A. E. Oxley, 472

NAMES OF PATENTEES.

A.C. Cars, Ltd., and another. Internal-Combustion Engine Cylinders, 693
Aldridge & Ranken, Ltd., and another. Apparatus for the Manufacture of Coal Gas, 693
Alley, S. E., and another. Combined Engine Crankshaft and Differential Driving Gear, 504
Alley, S. E., and another. Vertical Steam Boilers, 472
Andrew, C. D., and others. Boring and Turning Mills, 246
Armstrong, Sir W. G., Whitworth & Co., Ltd., and another. Boring and Turning Mills, 246
Armstrong, Sir W. G., Whitworth & Co., Ltd., and others. Coal Cutters, 567

Armstrong, Sir W. G., and another. Oil Fuel Burners, 693
Armstrong, Sir W. G., Whitworth & Co., Ltd., and another. Sighting Devices for Director Firing, 246
Armstrong-Siddeley Motors, Ltd., and others. Air-Brake Dynamometer Engine Power Testing Mechanism, 755
Armstrong-Siddeley Motors, Ltd., and another. Metallic Aircraft Construction, 307
Armstrong-Siddeley Motors, Ltd., and another. Tractors. 694
Armstrong-Siddeley Motors, Ltd., and another. Vehicles having Self-laying Tracks, 756
Ashley, T. J., and others. Apparatus for the Manufacture of Coal Gas, 693
Associated Equipment Co., Ltd., and another. Steering and Controlling Road Vehicles, 504
Associated Equipment Co., Ltd., and another. Transport Vehicles, 152
Atkinson, J. S., and others. Furnaces, 694
Attwood, S. H., and others. Force-Feed Lubricating Systems, 395
Aughtie, H., and others. Operating Reciprocating Conveyors, 567
Aveling, T. L., and others. Steam Boilers. 756
Aveling & Porter, Ltd., and another. Steam Boilers, 756

Babcock & Wilcox, Ltd., and another. Spraying Devices, 396
Bailey, A. S., and others. Brake Gear, 568
Bailey, A. S., and others. Metal Railway Vehicles, 34
Bailey, A. S., and others. Wheels and Axles, 568
Bailey, S. L. Change-Speed Gear-Operating Mechanism, 307
Bancroft, N. W. Taps and Cocks, 694
Barker, G. Springing of Vehicles, 396
Bedgood, H. O., and others, Drag-Line Excavators, 879
Bell, G., and others. Apparatus for Removing Coke from Retorts, 849
Bellamy, W. G., and others. Loose-Flange Pipe Joints, 471
Belyanin, P., and others. Automatic Valves, 850
Belyanin, P., and others. Cylinders, 307
Belyanin, P., and others. Piston, 395
Bennis, A. W. Furnace Grates, 880
Benson, R. S., and others. Screening and Washing Coal, 693
Bentley Motors, Ltd., and another. Brakes, 184
Bidder, M. McC. Cutting Metal, 849
Billetop, T. C., and another. Steam Engines, 471
Björnstad, J., and others. Apparatus for Indicating the Flow of Liquid through Pipes, 693
Blakeborough, R. A., and another. Operating Bulkhead Doors, 152
Bonhaud, H. M., and others. Tractors, 694
Bonhaud, H. M., and others. Vehicles having Self-Laying Tracks, 756
Briggs, R. J. P., and others. Insulators, 395
British Cotton Industry Research Association, and another. Thread-Testing Machines, 472
British Electric Plant Company, Ltd., and another. Dynamo Electric Machines, 879
British Mannesmann Tube Co., Ltd., and others. Loose-Flange Pipe Joints, 471
Broadbent, Thomas, & Sons, Ltd., and another. Centrifugal Friction Clutches, 755
Brookhirst Switchgear, Ltd., and another. Automatically - operated Electric Motor Starters and Controllers, 34
Brotherhood, Peter, Ltd., and another. Pressure Gauges, 694
Brown, C., and others. Carburettors, 395
Brown, C. A. Shutter Radiator Controllers, 152
Brown & Barlow, Ltd., and another. Carburettors, 395
Brown, David, & Sons (Huddersfield), Ltd., and others. Gear Cutting Machines, 880
Bryant, C. W., and others. Pressure Gauges, 694
Bullers, Ltd., and others. Insulators, 395
Burdon, W. M., and M. M., and others. Oil Fuel Furnaces, 693
Burdons, Ltd., and others. Oil Fuel Furnaces, 693
Burgess, F. T., and others. Brakes, 184
Burn, L. Speed-Reducing Gears, 788
Butterfield, W. P., Ltd., and another. Apparatus for Lock Forming Sheet Metal, 755
Butterworth, J. A., and another. Lifting Hooks, 788

C.A.V. Small Tools and another. Turning Lathes, 307
Cable Accessories Co., Ltd., and another. Electric Switches, 879
Calverley, J. E., and another. Commutators, 504
Cammell Laird & Co., Ltd., and another. Brake Gear, 568
Cammell Laird & Co., Ltd., and another. Metal Railway Vehicles, 34
Cammell Laird & Co., Ltd., and another. Wheels and Axles, 568
Camp & Co., Ltd., and others. Chains and Belts, 34
Cannock Chase Colliery Co. Ltd., and another. Coal-Cutting Machines, 788
Carter, R. H., and others. Chains and Belts, 34
Cash, J. Foundry Moulding Machines, 661
Cawkwell, A. A., and another. Water-Tube Boilers, 308
Chipperfield, W., and another. Jib Cranes, 880
Choriton, A. E. L., and another. Internal-Combustion Engines, 788, 879
Clark, F. W., and others. Furnaces, 504
Clark, H., and others. Screening and Washing Coal, 693
Coatalen, L., and others. Brakes, 34
Cooper, A. E., and another. Notching and Punching Presses, 152
Cooper, C. W., and others. Combing Machines, 472
Cooper, T. L. R. Combined Electric Motors and Pumps, 661
Crawford, A., and others. Electric Switches, 879
Crosse, E., and others. Vertical Heading or Forging Machines, 396

Davidson, J. Internal-Combustion Engines, 184
Davy Brothers, Ltd., and another. Fluid Pressure Hammers, 756
Dawson, Sir P., and another. Electric Railways, 568
Deighton's Patent Flue and Tube Co., Ltd., and another. Motor-Wagon Gulley Emptying and Recharging Apparatus, 756
Deighton's Patent Flue & Tube Co., Ltd., and others. Motor Wagon Oil-Fuel Furnace, 184
Dempster, Robert, & Sons, Ltd., and another. Gravity Bucket Conveyors, 246
Dexter, W. A., and others. Surface Condenser Installation, 472
Duncan, W. Y., Jun., and another. Making India-Rubber Tyres, 756
Duxbury, J. A., and others. Apparatus for Lock Forming Sheet Metal, 755

Eastern Telegraph Co., Ltd., and another. Electric Motors, 879
Edwards, C. K., and others. Transport Vehicles, 152
Electrical Apparatus Co., Ltd., and another. Electricity Meters, 693
Elliott, A. Water-Tube Steam Generators, 662, 694
English Electric Co., Ltd., and another. Vehicles for Use on Rail Traction Systems, 850
Evans, W. H., and another. Door-Locking Apparatus, 661

Fairburn, C. E., and others. Vehicles for Use on Rail Traction Systems, 850
Fairey Aviation Co., Ltd., and another. Rudders of Aeroplanes, 661
Fairey Aviation Co., Ltd., and another. Shock Absorbers, 307
Fairey, C. R., and others. Shock Absorbers, 307
Fairey, F. R., and others. Rudders of Aeroplanes, 661
Fallon, J. Mechanical Fuel-Feed Devices, 308
Fawcitt, E., and others. Jib Cranes, 849
Fawdry, F. W., and another. Electric Railways, 568
Ferguson Superheaters, Ltd., and another. Mixing Valve, 880
Fisher, Humphries & Co., Ltd., and another. Rotary Drying Cylinders, 756
Flannery, Baggallay & Johnson, Ltd., and others. Barges, 184
Foden, E. R., and others. Six-Wheel Road Vehicles, 850
Foden, H., and others. Liquid Fuel Burners, 850
Fodens, Ltd., and another. Six-Wheel Road Vehicles, 850
Fothergill, H. Boiler Feed Water Supply Plants, 662
Fothergill, H. Steam Power Plants, 308
Fowler, John, & Co. (Leeds), Ltd., and another. Road Scarifiers, 662
Fox, A. G., and others. Furnaces, 471
Fox, A. G., and others. Steam Generators, 568
Fulcher, F. C. Straining or Filtering Apparatus, 567

Gilfillan, K. A. B. Raising of Liquids, 184
Glossop, W. Spraying Apparatus for Treating Road Surfaces, 152
Graham, E., and another. Jib Cranes, 880
Guest, Keen & Nettlefolds, Ltd., and another. Vertical Heading or Forging Machines, 396

Hadley, C. A., and others. Electric Welding Apparatus, 755
Hadwen, C. M., and others. Mixing Valves, 880
Hand, T. W., and others. Fluid Pressure Hammers, 756
Harding, W., and another. Carburetting Apparatus, 849
Harker, A., and others. Barges, 184
Haslam, Sir A. S. Packing, 471
Hawker, H. G., Engineering Co., Ltd., and another. Securing Bolts, 34
Head, Wrightson & Co., Ltd., and others. Screening and Washing Coal, 693
Hedley, R. F. H., and others. Coal Cutters, 567
Hetherington, John, & Sons, Ltd., and another. Combing Machines, 472
Highfield, J. S. and W. E. Welded Joints, 661
Highfield, W. E., and another. Commutators, 504
Higgitt, H. V., and others. Electric Motors, 879
Holland, H. W., and another. Bomb Release Mechanism, 34
Hughes, J., and another. Hoisting Devices, 849
Husbands, H. W. S. Automatic Couplings, 850
Hutchinson, H. M., and others. Rotary Drying Cylinders, 756
Hutt, A. C., and another. Vertical Steam Boilers, 472

Inglis, R. J. M. Securing Rails in their Chairs, 34
Invernairn, Lord, and another. Internal-Combustion Engines, 788, 879
Ionides, P. D., and others. Sluice Gates, 788
Irving, B., and others. Oil Fuel Burners, 693

Jones, C., and another. Notching and Punching Presses, 152
Jones, W. Flattening, Stretching and Straightening Sheets, 246

Kearns, J., and another. Making India-Rubber Tyres, 756
Keay, David, & Leslie, Ltd., and another. Spinning-Frame Mechanism, 308
Keith, G., and others. Automatic Temperature Control Apparatus, 396
Keith, James, & Blackman Co., Ltd., and another. Automatic Temperature Control Apparatus, 396
Kemp, D., and others. Internal-Combustion Engines, 755
Kent, W. G. Water Meters, 395
Kitchen, H. E., and others. Gear-Cutting Machines, 880

Lamplough, F. Treatment of Hydrocarbon Oil Vapours, 661
Lennox, A., and another. Tube-Expanding Tools, 471
Lewin, W. J., and others. Motor-Wagon Gulley Emptying and Recharging Apparatus, 756
Lewin, W. J., and others. Motor Wagon Oil-Fuel Furnace, 184
Lewis, W. Y., and another. Water-Tube Boilers, 308
Linneker, J., and another. Coal-Cutting Machines, 849
Lithgoe, J., and another. Coal-Cutting Machines, 849
Livesey, A. C., and others. Automatically-Operated Electric Motor Starters and Controllers, 34
Lobnitz & Co., Ltd., and another. Drag-Line Excavators, 879
Logan, W. A. Coal-Cutting Machines, 504
London Electric Supply Corporation, Ltd., and another. Furnaces, 471
London Electric Supply Corporation, Ltd., and another. Steam Generators, 568

MacCallum, A. H. S. Transformers, 504
McClelland, N. E. Steam Boilers, 880
McDonnell, Hon. A., and others. Barges, 184
Mackay, H. J. S., and others. Steam Generators, 472
McLaren, H. Disc Cultivators or Harrows, 879
Mansfield, W., and another. Bomb Release Mechanism, 34
Maudling, A. W., and others. Dynamo Electric Machines, 879
Metcalf, J. A., and another. Tube-Expanding Tools, 471
Metropolitan Electric Tramways, Ltd., and another. Staircases for Passenger Vehicles, 662
Millington, C. A., and others. Motor Wagon Oil-Fuel Furnace, 184
Milnes, H. R. and J. W. Lathes, 396
Mirrlees Watson Co., Ltd., and another. Surface Condenser Installation, 472
Mordey, W. M., and others. Electricity Meters, 693
Morris, John, & Sons, Ltd., and others. Fire Engine Pumps, 850
Morris, J. and F., and others. Fire Engine Pumps, 850
Morris, H., and another. Lifting Hooks, 788
Morrison, R., and others. Sighting Devices for Director Firing, 246
Moss, A. H. Internal-Combustion Engines, 849

Napier, D., & Son, Ltd. Lubrication of Bearings, 755
Naylor, G. W. and J. F. Ingot Moulds, 693
Neep, G. H., and others. Protective Arrangements for Electric Distribution Systems, 755
Ness, J., and others. Spinning-Frame Mechanism, 308
Newbery, W. Sleeve-Valve Internal-Combustion Engines, 395
Newman, H. S., and others. Insulators, 395
Noble, E. E., and others. Water-Tube Boilers, 472, 568
Norton's (Tividale), Ltd., and another. Operating Reciprocating Conveyors, 567

Owens, R. L. Heat-Insulated Chambers, 308
Oxley, A. E., and others. Thread-Testing Machines, 472

Padfield, W. W., and others. Jib Cranes, 567
Palmers Shipbuilding & Iron Co., Ltd., and another. Internal-Combustion Engines, 755
Patterson, A. T. Furnace Fire-Bars, 568
Penn, O. S., and others. Endless-Track Vehicles, 184
Perl, A. H. F., and others. Chains and Belts, 34
Poynton, H. J., and others. Coal-Cutting Machines, 788
Pulsometer Engineering Co., Ltd., and another. Apparatus for Indicating the Flow of Liquid through Pipes, 693

Ransomes & Rapiers, Ltd., and another. Sluice Gates, 788
Reed, G. H., and another. Operating Bulkhead Doors, 152
Reynolds, F., and others. Sparking Plugs, 395
Ride & Bell, Ltd., and another. Apparatus for Removing Coke from Retorts, 849
Roadless Traction, Ltd., and another. Endless Track Vehicles, 184
Roberts, F. S., and another. Door-Locking Apparatus, 661
Rogers, H. G. Folding Mechanism, 661
Rogers, H. G. Printing Machinery, 567
Rose Street Foundry & Engineering Co., Ltd., and another. Electric Welding Apparatus, 755
Rowntree, F., and others. Automatic Valves, 850
Rowntree, F., and others. Cylinders, 307
Roxburgh, R. L. Gas-Fired Steam Boilers, 662
Ruston & Hornsby, Ltd., and another. Force-Feed Lubricating Systems, 395

Shilson, B. W., and others. Air-Brake Dynamometer Engine Power-Testing Mechanism, 755
Simm, J. S., and others. Internal-Combustion Engine Cylinders, 471
Simm, J. S., and others. Pistons and Piston Rods, 661
Smith, A. C. Electric Switches, 567
Smith, A. P., and another. Jib Cranes. 788
Smith, D., and others. Power Screw Presses, 788
Smith, Daniel, Ltd., and another. Power Screw Presses, 788
Smith, F. B., and others. Air-Brake Dynamometer Engine Power-Testing Mechanism, 755
Smith, S., and others. Internal-Combustion Engine Cylinders, 693
Smith, Thomas, & Sons (Rodley), Ltd., and another. Jib Cranes, 849
Stein & Atkinson, Ltd., and another. Furnaces, 694
Stirling Boiler Co., Ltd., and another. Steam Generators, 472
Stirling Boiler Co., Ltd., and another. Water-Tube Boilers, 472, 568
Stothert & Pitt, Ltd., and others. Jib Cranes, 567
Sunbeam Motor Car Co., Ltd., and another. Brakes, 34
Swan, Hunter & Wigham Richardson, and others. Automatic Valves, 850
Swan, Hunter & Wigham Richardson, Ltd., and others. Cylinders, 307
Swan, Hunter & Wigham Richardson, Ltd., and another. Pistons, 395
Switchgear & Cowans, Ltd., and another. Protective Arrangements for Electric Distribution Systems, 755
Sykes, A., and others. Gear-Cutting Machines, 880

Taylor, H. G., and another. Jib Cranes, 788
Thermal Syndicate, Ltd., and another. Sparking Plugs, 395
Thomas D. L. and another. Hoisting Devices, 849
Thomas, H. K., and others. Steering and Controlling Road Vehicles. 504
Thomas, J., and another. Carburetting Apparatus, 849
Thomson, B., and others. Securing Bolts, 34
Thompson, G. H. Percussion Tools, 152
Thornycroft, John I., & Co., Ltd., and another. Screw-Propelled Navigable Vessels, 308
Thornycroft, Sir J. I., and others. Screw-Propelled Navigable Vessels, 308
Tompkins, R. E. Sliding Windows, 850
Toogood, H. J., and others. Gravity Bucket Conveyors, 246
Toplis, C. M., and others. Jib Cranes. 567
Travers, M. W., and others. Furnaces, 504
Travers & Clark, Ltd., and others. Furnaces, 504

Wade, F. R., and others. Turning-Lathes, 307
Walker Brothers (Wigan), Ltd., and another. Motor Road Vehicles, 307
Walker, E. G., and others. Staircases for Passenger Vehicles, 662
Wallis, A. Road Rollers, 396
Wallsend Slipway & Engineering Co., Ltd., and another. Internal-Combustion Engine Cylinders, 471
Wallsend Slipway & Engineering Co., Ltd., and another. Pistons and Piston Rods, 661
Ward, L. Pumps, 307
Watson, E. Steam Boilers, 756
Watson, H. B., and another. Steam Engines, 471
Weir, A. H., and others. Centrifugal Friction Clutches, 755
Weir, G. & J., Ltd., and another. Steam Condensers, 504, 694
Weir, J. G., and others. Steam Condensers, 504, 694
Weston, S. F., and others. Spraying Devices, 396
Whelan, W. Thrust Bearings for Marine Engines, 471
Wild, M. B., and others. Friction Brakes, 755
Wild, M. B., & Co., Ltd., and another. Friction Brakes, 755
Wilkinson, G. S., and others. Lubrication of Bearings, 755
Williams, C., and others. Loose-Flange Pipe Joints, 471
Williamson, W. D., and others. Motor Road Vehicles, 307
Wilson, Henry, & Co., Ltd., and another. Liquid Fuel Burners, 850
Wilson, R. W., and others. Coal Cutters, 567
Wood, D., and others. Road Scarifiers, 662
Woodvine, G., and another. Combined Engine Crankshaft and Differential Driving Gear, 504
Wylie, H. N., and others. Metallic Aircraft Construction, 307

Yarrow, H, E. Steam Re-heaters, 246

LONDON:
Printed for the Proprietors by HARRISON & SONS, LTD., at the BEDFORD PRESS, 20 & 21, Bedfordbury, in the Parish of St. Martins-in-the-Fields, and published by CHARLES ROBERT JOHNSON, at the Offices of "ENGINEERING," 35 & 36, Bedford-st., in the Parish of St. Paul, Covent Garden, both in the County of Middlesex.—Friday, January 23, 1925.